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A Twenty-third Memoir on the Law of Storms in the Indian and China Seas; being the Peninsular and Oriental Steam Navigation Company's Ship PRECURSOR's *Cyclone, of October,* 1851.—*By* HENRY PIDDINGTON, *President of Marine Courts.*

This Memoir furnishes us not only with a new track for the Cyclones at the Sand Heads, but, at length, an instance of the rare, though not unexpected case of the undoubted curving of a Cyclone track to the North-East in the Bay of Bengal, analogous to those which are so commonly seen in the Western hemisphere! and which we have recently shewn to occur in the China Sea.

I commence the documents with the Logs of the ships farthest to the Southward, so as to trace the Cyclone inwards from sea. The documents are followed by a tabular arrangement of them and a summary, detailing the data on which this remarkable track is laid down, and this by remarks on the various accessary phenomena and results of the investigation.

Abridged Log of the Barque ARARAT, *Capt.* RITCHIE, *from Mauritius to Calcutta—reduced to Civil Time.*

18*th October*, 1852.—The *Ararat* was at Noon in Lat. 11° 35′ North; Long. 87° 12′ East, with her Barometer at 29.82; Ther. 87°. Steering to the north with a six knot breeze at W. S. W.; P. M. a little squally.

19*th Oct.*—A. M. more settled; but at daylight dark cloudy weather with sharp squalls, continuing to Noon when Lat. 13° 50′ N.; Long. 29° 81′ E.; Ther. 84°; Bar. not marked; Wind from W. S. W. to W. b. N. P. M. wind

marked S. S. W, strong breeze and threatening weather, which increased to midnight, when wind is marked at S. b. W.; continued squalls and heavy rain.

20*th Oct.*—The same, but moderating a little at daylight. 10.30 A. M. violent squalls from S. W. and S. b. W. At Noon a heavy sea coming up from the N. Westward with a very heavy appearance, Lat. Acct. 16° 28′ N.; Long. Acct. 86° 58′ E.; Bar. 29.75; Ther. 84°. 1 30 P. M. rounded to; wind S. S. W. increasing gale and more squalls. Barometer gradually falling. 2 P. M. Bar. 29.67. Midnight hard gale and torrents of rain.

21*st Oct.*—4 A. M. bore up. Noon more moderate. Lat. Obs. 17° 6′ N.; Long. 87° 50′ East; Bar. 29.70; Ther. 84°. Wind South at 5 A. M. and S. S. W. at noon; P. M. S. S. W. to midnight. Moderate gale, ship running 7 and 8 knots to the N. b. W. but by sunset hard squalls from the southward. Midnight, hard gale and squalls; 10 kuot breeze; wind about South.

22*nd Oct.*—3 A. M. wind South; 4 A. M. close reefed. Daylight hove to again and made all preparations for a hard blow. 10, gale increasing and squalls more severe from the south, "*A dense black bank hanging to the westward.*"* Bar. 29.62. "At 11, a hard *dry* gale" with a heavy sea; Noon hard gale. Lat. Obs. 19° 10′ N.; Long. Chr. 88° 2′ E.; Bar. 29.66; Ther. 87°. P. M. wind S. W. b. S.† hard gales lying to. The same to midnight.

23*rd Oct.*—9 A. M. wind marked S. S. W. hard gale. Lat. by Indff. Obs. 19° 30′ N.; Long. Acct. 88° 04′, Bar. 29.68; Ther. 86°. At 3 P. M. wind S. W. b. W.; 6 P. M. W. S. W. moderating and wind hauling to the westward.

24*th Oct.*—3 A. M. wind W. N. W.; 6 A. M. N. W.; at 2, in 47 fathoms mud. Daylight fine; Noon Lat. 20° 32′ north; Long. 88° 10′ east; Bar. 29.74; Ther. 86°.

Abridged Log of the Barque Easurain, *Captain* Cloughton, *from Penang to Calcutta—reduced to Civil Time.*

The *Easurain* was at Noon on the 20th Oct. 1851 in Lat. 15° 25′ N.: Long. Chr. 91° 56′ E. P. M. moderate breezes (7 knots S. East and fine.) Bar. corrected to that of the Surveyor General's Office, 29.95. A heavy S. W. swell.‡ Midnight the same and ship rolling very heavily.

21*st Oct.*—Moderate 7 and 8 knot breeze, South to S. S. W. to Noon with a very heavy S. W. swell. Wind S. E., ship endangering her masts by rolling

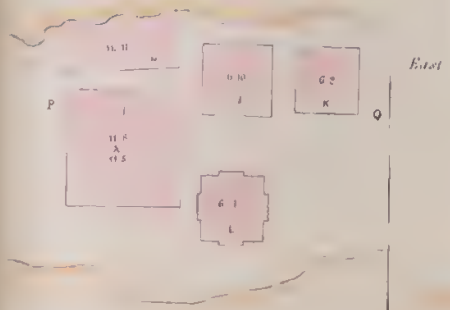
* Italics are mine, this bank was the body of the Cyclone.

† See remarks.

Nº 2.

Plan of a portion

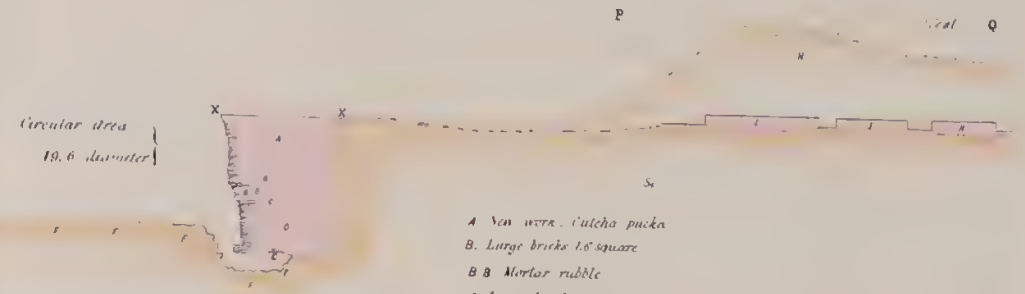
OF Nº 3.



Nº 3

ENTIRE SECTION OF Nº2 ON P Q

AND CONTINUATION TO X X F F



A New work. Cutcha pucka

B. Large bricks 1.6 square

B B Mortar rubble

C Large bricks 1 1 square

D Old masonry work

E. Lime rubble below the foundation

F. Clean earth unmixed with foreign substances & previously undisturbed

N Outline of the original Brick Kiln prior to excavation

I. J K L M. Chubootras which seemingly served as pedestals to the figures of Buddh no less than four of which were found mutilated near the spot.

I B These Chubootras are Brick work plastered with lime.

The Original Statues of Buddh which stood thereon, were found, to the number of four all being of Similar out line, broken near their pedestals

Lith by H M Smith Surv Gen's Office, Calcutta July 1854

so much. Noon the same swell. Lat. Obs. 17° 4′ N.; Long. Chr. 90° 33′ E.; Bar. 29.93; Ther. 86°; Current S. ½ W. 20′ in the 24h. P. M. wind South ship running 6 and 7 knots to the N. b. W. with a heavy *cross* sea from W. N. W. to S. W. rolling gunwales under and masts in constant danger;* at 5 Bar. 29.95; at 6, 29.88; at 8, 29.90; midnight 29.88. Strong gales South; cloudy, and very heavy turbulent sea.

22*nd Oct.*—A. M. strong gales South and cloudy, turbulent cross sea. 4 A. M. Bar. 29.89; 6 A. M. Bar. 29.88. Fresh gales and passing squalls with a dark threatening appearance to W. S. W. 8 A. M. Bar. 29.90. Close reefing. Noon strong gales and a tremendous cross sea. Lat. Obs. 19° 39′ N.; Long. Chr. 89° 55′ E. Bar. 29.88; Ther. 86°; Current S. E. b. E. 16 miles. P. M. ship steering 7 knots to the N. b. W. ½ West strong gales S. S. W. course N. W. ½ W. 7 knots to 4 P. M. when hove to. Bar. 2 P. M. 29.88; 4, 29.88; at 6, 29.84; at 8, 29.87; midnight 29.85. Hard gales and tremendous sea from S. W. to west.

23*rd Oct.*—A. M. Bar. 29.82; 4 A. M. 29.84. Daylight hard gale S. to S. S. W. and high sea Bar. 29.88. Noon the same and sea as before S. W. to west; Lat. Obs. 20° 11′ N.; Long. Chr. 89° 41′ E.; Bar. 29.85; Ther. 84°. P. M. wind S. S. W. to S. W. Lying to as before, sea the same; 2 P. M Bar. 29.80; at 3, 29.76 dark gloomy appearances to West and increasing sea; at 6, Bar. 29.76. *A strange phenomenon appeared all at once. The sky from west, northerly, to north easterly, assumed a lurid hue like fire and continued to appear so for about three quarters of an hour.*† At 8, Bar. 29.78. tremendous sea continning; midnight Bar. 29.84.

24*th Oct.*—4 A. M. Bar. 29.00; moderating; 5 A. M. wind S. W. to West sea going down fast; Noon Lat. Obs. 19° 54′; Long. Chr. 90° 24′; Bar. 29.10; Ther. 65°, fresh breeze and cloudy.

Abridged Log (from a tabular Extract) of the Ship Lord Petre, *Capt.* Middleton, *from the Mauritius bound to Calcutta.*

21*st Oct.*—At Noon in 19° 20′ North Lat.; Long. 89° 54′ East. Wind S. W. to S. b. E. South and S. b. E. light vessel bearing N. W. 120 miles. Bar A. M. 29.86; P. M. 29.90 and 29.86; Ther. 78° and 77°; A. M. squally;

* These seas were the rearward sea of the Cyclone and the regular Monsoon sea.

† I have put this in Italics, but the hour of the day and its appearance between west and north leave no doubt it was an effect of the sunset; but from the bearing of the Cyclone disk, it was also the sunlight seen *through* it, and we have thus perhaps in part, here one explanation of the phenomenon of the red sky as an effect of refracted light; though not for the long periods during which it has been observed.

4 P. M. hove to. Dark squally weather. Midnight strong gale, under close-reefed main topsail, &c.

22*nd Oct.*—Wind S. b. E. Bars. 29.78 and 29.80; P. M. 29.70 and 29.70; Ther. 78°; Noon Lat. 20° 02′ N.; Long. 89° 20′ E. A. M. strong gales to 8; at Noon moderate and cloudy, but P. M. strong gales and squalls with severe lightning. Hove to as before.

23*rd Oct.*—Wind S. b. W. and S. S. W., S. W. b. W. and W. S. W. Bar. 29.70 and 74 to 78. At 9 A. M. Light Vessel station calculated to bear N. W. 50 miles: Noon Lat. 20° 29′ N.; Long. 89° 14′ E.; 6 A. M. hurricane till 9 A. M.; at Noon fresh gale; midnight dark squally appearance to the S. W. with much lightning.

24*th Oct.*—Wind West to W. b. N. Bar. 29.82 and .85 to .87 and .90: Noon Lat. 19° 51′ N.; Long. 89° 51′ East. From 2 to 8 A. M. much lightning and heavy rain. Noon fine weather.

Ship Fazeel Currim.

The *Fazeel Currim*, on the 21st October, when in about Lat. 19° 30′ N.: Long. 89° 40′ E. experienced a severe gale which lasted about 60 hours with occasional lulls; sent down top gallant yards and masts and housed mizen topmast; bore up for Sand Heads 24th October, at 7 A. M.

Abridged Log of the Ship Georgiana, *Capt.* Williams, *from Liverpool to Calcutta, arranged to Civil Time.*

Date.	*Bar. No. 1.*	*Bar. No. 2.*	*Symp.*	*Ther.*	*Wind.*	*Remarks.*
Oct. 19th, 1851.	29.90	29.97	29.45	89	E. S. E.	P. M. moderate breeze and cloudy with smooth water; stood in and anchored at 2.30 P. M. in 9½ fms. veered out to 50 fms. on best bower; current running strong to the W.
					East.	S. W. storm *glasses very much agitated, my Bar. No.* 1, *has a very large tube and I have never before*
	29.93	29.93	29.43	89		*in the worst of weather witnessed such a pumping motion*, it pumps up and down as much as a full tenth of an inch and the water is smooth, very suspicious. Sent down royal and top gallant yards. Mid:
					E. N. E.	part light airs and calms with occasional flashes of lightning to the East and misty rain.
20th Oct.	29.92	29.92	29.43	..		8 A. M. looks threatening to the
	30.01	30.01	29.55	88		S. E. breeze freshening got under weigh and stood to the S. E. to 25 fms. and in to 10.

Date.	*Bar. No. 1.*	*Bar. No. 2.*	*Symp.*	*Ther.*	*Wind.*	*Remarks.*
Oct. 20th, 1851.	29.91	29.90	29.35	89	E. S. E.	Noon moderate and has a soft wet appearance, no observations, very little current. Lat. Acct. 21° 4′ Long. 88° 40′.
	29.86	29.86	29.45	87	E. S. E.	P. M. Damp cloudy weather with light squalls. 4 P. M. finding the current again setting strong to the W. S. W. anchored in 10 fms., mud and sand with black shining specks; sent down top gallant masts.
	29.88	29.89	29.40	88		Mid. part light airs; a bank to the S. E. with lightning in that quarter and a swell from the Eastward and south.
21st Oct.	29.84	29.84	29.35	..	E. S. E.	4 A. M. ditto weather Bar. very unsteady. Daylight, prepared for sea; breeze increasing and sea getting up.
	29.83	29.72	29.34	..	S. E.	10 A. M. looks suspicious to the E. S. E. and South, got under weigh with all possible speed and stood to the S. W. current setting to the north; noon wind and sea increasing. Weather very clear over head with a dark gloomy appearance
	29.77	29.76	29.30	89	S. E. b. S.	to the eastward round to south. Lat. Obs. 21° 00 N. Long. 88° 30′ E.
						P. M. increasing breeze squally; sea getting up rapidly; 3 P. M. 12 fms. water.
	29.68	29.67	29.20	88	S. E. b. S.	4 Weather looks wild, heavy head sea S. W. carrying all possible sail to get an offing.
						6 P. M. ditto increasing; double reefed; close reefed mizen and too reefed main sail; a sea burst the jib and it blew to ribbons.
	29.60	29.60	29.18	88	S. E. b. S.	8 Tremendous head sea, heavy squalls with lightning, close reefed.
	29.57	29.52	29.15	..		Midnight, tremendous squalls, incessant lightning, heavy cross sea S. E. and S. W. ship very laboursome; split main sail and it blew to pieces; forecastle full of water brought crew aft to live; sounded in 35 fms. stiff bottom.
22nd Oct.	29.53	29.52	29.10	87	S. S. E.	4 A. M. gale very severe 4.30 A. M. Foresail and foretopsail blew out of the bolt rope bent another foresail by the reef and set it; got another topsail on the forecastle but was obliged to lash it to the Capstan, not possible to get it aloft; seas running over all.

Date	*Bar. No. 1.*	*Bar. No. 2.*	*Symp.*	*Ther.*	*Wind.*	*Remarks.*
Oct. 22nd, 1851.						6.15 A. M. Wind veering more to the South wore ship to N. E. in 25 fms. mud. Extreme of Palmyras reef S. W. b. W. 15 miles.
						10 A. M. a Tremendous squall of wind and rain, ship almost on her broadside, but there was nothing for it, but hold on every thing, Burst the forestorm stay sail, mizen stay sail blew away, wind veered to S. W. ship heading up E. S. E. took
	29.48	29.47	29.04	86	S.W.b.S.	the current on the lee beam and at noon, ship is in 35 fms. water.
					S.W.b.S.	P. M. a hard gale and violent squalls ship under reefed foresail and storm main stay sail and making much better weather; checked the yards
	29.53	29.52	29.06	84		and kept ship E. S. E. bent the F. topsail close reefed and handed it
	29.63	29.62	29.15	84	S. W.	4 P. M. ditto; glasses on the rise. Midnight violent squalls, tremendous cross sea, larboard bulwarks washing away.
23rd Oct.	29.68	29.68	29.20	82		4 A. M. 45 fms. the gale appears broke.
	29.69	29.69	29.25	..		8 A. M. ditto weather.
					S. W.	Noon more moderate but the weather has a very dirty appearance, looks very wild. sounded 45 fms. I allow the ship to be about 25 miles south of the Floating Light.
	29.70	29.70	29.25	..	W. S. W.	P. M. strong gale and squally, set the top sails close reefed.
						8 P. M. weather breaking up; lightning to the westward.
	29.78	29.77	29.30	..		Midnight squalls with heavy rain thunder and lightning to the eastward; sea going down fast.
						A. M. moderate and fine.
24th Oct.	29.81	29.80	29 35	88	West.	Noon ditto Lat. Obs. 20.34 N. Long. 89.10 E.

By a comparison obtained here with the standard, for Capt. Williams's Bars. No. 1 required a correction of + 0.130, and No. 2, of + 0.07, to reduce the indications to ours here, and these corrections have been made by me, H. P.

Letter and Barometrical Tables from Mr. W. Barckley, *Superintendent of* False Point *Light House.*

I beg to forward you statements, and memoranda of the Cyclone, that visited *False Point*, and its vicinity.

1st. In the forenoon of the 21st inst. I saw heavy clouds rising to the Northward and Eastward, occasionally with heavy rain. At noon the wind N. N. E. with heavy squalls and rain at intervals; at 4 P. M. I took great notice of the scuds from the Northward and Westward, and a lower scud from the S. E. crossing each other with a haze, and a red tinge. Round the horizon, was a circle of haze, and the breeze continued to freshen, till it increased to a strong gale, and veered from N. N. E. to S. E. with heavy passing showers, till 3 in the morning of the 22nd, with a falling Barometer all the time; but at times with a clear sky over head, and a thick haze round the horizon. At 5.15 A. M. of the 22nd inst. the Cyclone was at its highest, and at 7.30 A. M. it lulled to a stark calm, and then it set in a heavy mist all round, but very black to the southward. The calm lasted from 7.30 A. M. to 8.30 A. M. and then began to blow hard till it increased to blow as heavy as it did to the S. E.* and veered from South to West till 3 P. M. when the Cyclone broke to nearly a calm with a rising Barometer.

2nd. I also make this remark on the storm wave; that the sea we could hear from 10 to 15 minutes, before the first roller reached the Light House, and it came in with three regular steady rollers, and then it was done, and left the whole place in an inundated state, carrying every thing before it; leaving us without a drop of fresh water about the place. It was really frightful to hear it. If I had been a landsman, I should thought it was an earthquake; it has swept one-third of Dodwell's Island away, the height of it† was 23 feet, but this storm wave extended to a place called Tuldundah, 24 miles from the mouth of the Mahanuddee river; this information I received from my men whom I sent out in different directions, from W. N. W. to S. S. W. distance about 30 miles each way from the Light House. At Tuldundah, even the embankment was washed away. The names of the places that suffered greatly are Tikree, Kodakon, Rogonatpore, Nowgong, Boliparra, Danton, Damapore,

* So in MSS. † The rise—W. B.

and Paradeep; all these villages are nearly washed away, and about 1,430 head of cattle, have been accounted for as lost, and 120 men: my men passed a great number of bodies, floating in the Mahanuddee river.

3rd. I have suffered greatly at the Point, 13 panes of glass in the lantern, lightning-conductor, lamps, and reflectors gone; all the men's and other out-houses swept away, and my assistant and his family completely washed out of their house. The whole of my boats completely destroyed with the exception of my little jolly boat, and she was stove in. This is the most severe Cyclone I have experienced for the 31 years I have been at sea, yet I find they felt very little of it at Cuttack, which is 60 miles from here, in fact I have nearly lost my all. On Sunday the 26th inst. I boarded the *Margaret S. Kelly*, in distress, with her ensign union down, going off through the heavy surf in my little jolly boat, about 10 miles off, and the Captain stated that he had seen the Black Pagoda, the night before the Cyclone came on; I questioned him about his Barometer, but he could not give me any information, for he had not a light on board his vessel all night, but he mentioned to me, *that such awful thunder and lightning he never experienced, but we had none at the Point:* he could not even tell me, how the winds varied.

I herewith enclose a register of the winds and Barometer, with remarks at False Point.

A Register of Winds and Barometer with Remarks.

21st October, 1851.

Hours.	Baromt.	Winds.	Remarks.
Noon.	29 ,, 85	N. E.	Strong breezes from the North and East with heavy squalls, and showers of rain, with every appearance of a strong gale; sky very clouded.
1 P. M.	29 ,, 80	,,	
2 ,,	29 ,, 70	,,	
3 ,,	29 ,, 70	,,	
4 ,,	29 ,, 60	N. N. E.	At 4 P. M. Scuds from the North and East and a lower scud from the S. E. crossing. Clouded horizon and clear over head with light rain.
5 ,,	29 ,, 55	N. E.	
7 ,,	29 ,, 51	,,	
8 ,,	29 ,, 50	,,	
9 ,,	29 ,, 52	,,	
10 ,,	29 ,, 60	East.	
12 ,,	29 ,, 50	N. E.	

22nd October, 1851.

2 A. M.	29 ,, 45	E. N. E.	2 30 A. M. The Sea made a complete breach up to the Light House like the rush of the bore; and carried away all the boats, boat-houses, anchors and chains, and gates of the inclosure.
4 ,,	29 ,, 22	East.	
4 ,, 15	28 ,, 60	,,	
5 ,, 15	28 ,, 5	S. E.	
6 ,,	28 ,, 30	,,	
7 ,,	28 ,, 10	,,	7 30 A. M. Stark calms with heavy rain.
9 ,,	28 ,, 5	Calm.	9 30 A. M. Blew a complete hurricane with the wind at South, with rain.
10 ,,	28 ,, 21	South.	
10 ,, 30	28 ,, 30	,,	
11 ,,	28 ,, 51	,,	
11 ,, 30	28 ,, 70	,,	
Noon.	29 ,, 0	S. W.	
1 P. M.	29 ,, 30	S. W.	
9 ,,	29 ,, 45	,,	
2 ,, 15	29 ,, 38	,,	
3 ,,	29 ,, 50	West.	At 3 P. M. Gale broke with the wind at West.
4 ,,	29 ,, 50	,,	At 4 P. M. The water subsided.
4 ,, 30	29 ,, 54	,,	
5 ,, 30	29 ,, 60	,,	
7 ,,	29 ,, 60	,,	
8 ,,	29 ,, 60	,,	
9 ,,	29 ,, 65	,,	
10 ,,	29 ,, 65	,,	
11 ,,	29 ,, 70	,,	
12 ,,	29 ,, 70	,,	

23rd October, 1851.

2 A. M.	29 ,, 70	West.	
4 ,,	29 ,, 70	,,	Fine weather throughout.
6 ,,	29 ,, 70	,,	
8 ,,	29 ,, 72	,,	
10 ,,	29 ,, 72	,,	
12 ,,	29 ,, 72	,,	

Abridged Report from Mr. A. BOND, *Master Attendant, Balasore. To Captain* ROGERS, *Superintendent of Marine, Calcutta.*

SIR,—I have the honor to report that on the 22nd inst. whilst in charge of the *Orissa* bound to Calcutta, I experienced a severe gale, similar to the Cyclone of April, 1850, by which I have lost the *Orissa's* main and fore-masts, having cut them away to save the vessel from being beached and filled, whilst drifting on shore with two anchors ahead.

On the 20th of October.—It appeared cloudy and the Bar. was at 29.66; but falling slightly, wind S. E.; I therefore ran in from the mouth of this river (thinking something must have caused the tides to be earlier by 2 hours than customary) as far as I could to get room to veer away cable, and made all snug. On the 21st, Bar. fell to 29.60 with rain but no indication of a

storm, wind E. S. E and squally at times with rain and heavy sea, five vessels ran ashore; six ran into this river.

22*nd Oct.*—The wind at E. and E. N. E. Bar. A. M. 29.50; at 1 P. M. Bar. 29.55; wind freshening, tried to get down the fore yard on deck, found the nut of the chain slings so jammed, that the yard could not be got down. At 3 P. M. Bar. 29.45; very squally; Brig drifting with the best bower ahead; let go the small bower, which brought her up, blowing hard E. N. E. to N. E. both anchors ahead; at 4 P. M. Bar. 29.40, very heavy sheets of rain with heavy gusts at N. E.; at 4-50 P. M. Bar. 29.20, found the vessel dragging both anchors, and the sea and river one sheet of water, cut away the fore mast which fell on the main stay and sprung the mainmast, which I also ordered to be cut away, when she brought up and held on; at 6 P. M. Bar. 29.10, wind N. E. to N. N. E. heavy rain with roaring gusts; at 8 P. M. Bar. 29.1, wind N. with similar gusts of wind and sheets of rain. The Bar. remained at 29.1 till high water, when at 9 P. M. the wind veering round from N. W. to W. the gale decreased but blew strong from the westward till 3 A. M.

23*rd Oct.*—A. M. at daylight found all the vessels ashore (but one) with masts gone, and some turned over which had run into the river on the 21st. Out of 24 vessels only one vessel is afloat besides the *Orissa;* 5 vessels in pieces, the rest are wrecks down the coast.

Barque Scourfield, Captain Skelton.

The Barque *Scourfield* Capt. Skelton was lying at anchor close to the Pilot vessel at the station, but had been unable to get a pilot put on board before the Cyclone commenced, and driving from her anchors, was eventually lost on the coast of Balasore Bay. A long account of her loss, and of the sufferings of her crew was published by Capt. Skelton in the Calcutta *Englishman*, which after detailing her attempts to work up to the station in company with a French ship which afterwards foundered or was lost on the sands with all hands on board, continues thus:

Tuesday, October 21*st.*—A fresh south easterly wind and squally. At 10 A. M. very squally with heavy swell setting in from the southward. At 11 A. M. Pilot brig passed close to us under sail, and when signalized for a Pilot, answered—"when the weather moderates." Wind kept increasing with hard squalls. At 1 P. M. bent my best topsails and courses, struck top gallant yards and made every preparation to slip, intending to do so if I saw any possibility of getting to the southward. During the night the ship rode very heavily, cable to the bare end.

Wednesday, October 22nd.—Blowing hard from south-east with roaring gusts. At 4 P. M. she started the anchor and dragged. I immediately let go the other and gave her 50 fathoms, which brought her up, both then appearing to have an equal strain.

Bar. rose and fell from 29.70 to 29.60. At daybreak I found by the Brig that I had dragged about 3 miles; it was then blowing a hard gale at south-east. At 8 A. M. in a tremendous pitch she parted both cables, I got her head to south-west, slipped the starboard chain, hove in the port, and set the reefed courses. About 3 hours after, the sails blew to ribbands (although nearly new) in a violent gust that also took the mizen topmast and top-gallant masts with it. Bar. at 29.50. From this time the gusts of wind became more frequent with increased strength, for each successive one brought something down; the topsails though securely stowed were gradually blown from the yards, the quarter boat was blown up the mizen rigging, the weight of which carried away the mast and it went over the side. Bar. now fell considerably. At 4 P. M. we were laid on our beam ends (although a remarkable stiff vessel), and driving to the westward, about 6 miles an hour fearfully fast, and knowing that now I could not be far from the land, I cut away the masts, deeming it the only chance for the safety of our lives, and let go the remaining anchor which we had with great exertion got over the bows and bent to it the remainder of the port chain. As soon as the masts were gone, and the ship came head to wind, it rushed in at the doors of the poop and took the deck of it clean over the taffrail, leaving the sea to finish, which it soon accomplished; sweeping away all our instruments, charts and other effects.

She continued dragging the anchor till about midnight, when it moderated; the vessel now rolled fearfully, and the wreck of boats, galley, &c. rendered it impossible to get upon deck. During the extreme violence of this hurricane, the Bar. fell below 28 inches, but it did not do so until that time. As I have lost all memoranda of it, I cannot recollect how low it did fall. This was indeed a fearful night, not one of us expected again to see daylight; but it was God's mercy to spare our lives.

On the 23rd Oct.—A heavy sea and fresh westerly wind, and from this time the ship utterly dismasted and without rudder, masts, chart, compass or a serviceable anchor; the stock and one fluke of the only remaining one being gone. Drifted about Balasore Bay till Wednesday the 29th when she grounded, the crew saved themselves on rafts and arrived safely at Kedgeree.

It appeared by the evidence on a trial in the Marine Court which arose out of the loss of this vessel that as early as the 19th of October, the set to the westward, at the Light vessel, which had begun in the night between

the 18th and 19th was from 1 knot to 1½ knot per hour during the whole of the 19th.

Abridged Log of the Ship LUCKNOW, *Capt.* FAUSET, *leaving the Pilot. From Calcutta bound to Demerara, with Coolies on Board—Civil Time.*

20*th Oct.*—Pilot left the ship at 9.30 P. M. on the 19th. Midnight squally and rain, wind variable from Eastward. Ship standing to the South and S. S. W.; 6 A. M. wind E. S. E.; 8 A. M. N. East. Noon Lat. by Acct. 20° 40′ N.; Long. Acct. 87° 54′ East. P. M. Wind East; ship standing South 4 knots, cloudy weather; at 10 P. M. wind N. E.; midnight increasing with rain. Double reefs.

21*st Oct.*—2 A. M. *strong gales* N. E., but course is marked S. b. W. and the wind N. East yet only 4 knots! 2 A. M. heavy head sea; 6, heavy gales; 10 A. M. hove to. No position given at Noon. By Log worked up, she appears to be at 10 A. M. in Lat. 19° 13′ N.; Long. 87° 47′ E. At noon in Lat. 19° 9′ North; Long. 87° 43′ East. Strong gales with rain (direction of wind not marked) and heavy squalls. P. M. wind is marked N. W. and at 8 P. M. S. W. or veering a point in an hour. At 6, gale moderating, midnight stiff gale and cloudy.

22*nd Oct.*—A. M. the same; wind apparently S. W. to Noon. Making sail gradually. Noon, gale moderating. Lat. 17° 44′ N.; Long. 87° 30′ East.

Abridged Log of the H. C. P. Vessel CAVERY, *Mr. Branch Pilot* E. BARTLETT, *proceeding to the Cruizing Station—Civil Time.*

21*st Oct.* 1852.—Winds E. b. S. to S. E. b. S. and squally. Heavy rain with thunder and lightning from N. E. to N. W. at 8 P. M. At 1 A. M. anchored near Saugor Sand Buoy; A. M. weighed to proceed down; 11 A. M. wind S. E. b. S. blowing fresh; in 2nd reefs. Vessel now working to seaward from 18 fathoms water; midnight strong and increasing breeze from E. S. E. Bar.* 4 A. M. 29.99; at 8h. 29.95; at Noon 29.95. At 4 P. M. 29.93; at 8h. 29.92; at midnight 29.95.

22*nd Oct.*—Winds from E. b. S. to W. S. W. heavy hurricane from E. S. E. to S. S. W. A. M. moderate gale from E. S. E.; 1-45, increasing; 2 A. M. in 23 fs.; at 2.30 A. M. wind oscillating from E. S. E. to S. E.; 4 A. M. in 30 fs. water; 4.30, gale increasing; daylight heavy gale and hard continued squalls from E. S. E. to S. E. and tremendous sea; topsails on the cap furled mainsail; obliged to cut away foresail. In 25 fs. water; 8 A. M. 22

* Corrected by + 0.10 from a comparison with the Standard.

fs. water; gale increasing to a hurricane; 10 A. M. 16 fs. water. Vessel on her beam ends and settling down; cut away topmasts and lost heads of the lower masts with them; sea rising in pyramids; 11 A. M. had drifted into 12 fs. Anchored, and finally brought up in 9 fs. with two anchors. 2 P. M. wind *veered* to S. S. W. blowing with equal force, tearing the furled sails from the gaskets. 4 P. M. Bar. began to rise, but gale unabated.; 8 P. M. wind going round to the westward; midnight gale moderated at W. S. W. Bar. at 4 A. M. 29.69; at 5h. 29.65; at 6h. 29.50; at 7h. 29.40: at 8h. 29 37; at 10h. 29.30; at 4 P. M. 29.45; at 7 P. M. 29.60; at 8h. 29.75; at midnight 29.80.

23*rd Oct.*—Towards morning a great deal of lightning to the S. W. Position about Lat. 20° 44′ N.; Long. 87° 20′ East; winds variable from West to N. N. W. Bar. at 4 A. M. 29.90.

Abridged Log, Tables, and Remarks of Mr. Branch Pilot, S. RANSOM, *Commanding H. C. P. V.* TAVOY, *in the Eastern Channel.*

We are indebted, and very greatly so, to Mr. Ransom for the following interesting documents, of which I arrange the extracts useful to our purpose in a somewhat different form than that in which they reached me; and I abridge them also at times to economise details. The remarks given are most valuable, and cannot be read with too much attention.

From the 6th of Oct. 1852 *up to the* 17*th*—We had one delightful spell of fine weather (the *Tavoy* being stationed in the Eastern Channel); pleasant southerly breezes and a high Barometer; the 18th showed a decided change in the state of affairs, and drew my attention to it immediately. A. M. calm, sultry, Ther. higher than usual, noon squalls from North to East with excessive heavy rain, wind unsteady, and much sharp thunder and lightning. This same suspicious weather continued to increase daily up to the 20th, before the glasses became affected by it; after that the enclosed table will shew you the gradual decline of them, and although the total depression was not great, still the weather was for 24 hours very severe and the sea tremendously high, breaking, and confused, coming principally from the S. S. E. to S. E. until the wind got to the W. S. W. when it was a pyramidical mass of waves running one against the other,* the weight of rain in the frequent fierce squalls was beyond any thing I ever witnessed; it was a sheet of falling water "*en masse.*" Occupying the Floating Light station (Eastern Channel) and being at anchor, I had little else to do but to prepare my bark for the

* The wind against the track.

evident coming struggle ; and well she behaved through the whole of it, with top gallant masts down on deck, and 160 fs. of good coir cable out; she braved the whole without starting an inch from her position. However, I am of opinion that we did not lay in the heaviest track of this breeze although very near it. The glasses were at one time very uneasy, and a sudden fall occurred in the Marine Barometer which drew my instant attention. I thought I might have made a mistake in the reading off? but No, repeated examinations showed me I was correct, the Aneroid and Sympiesometer followed the movement subsequently, but not so quick as the Marine Barometer (by Newman, London). The abstract will show you the course of the wind from the 18th to 8 P. M. of the 23rd.

On the 24th.—After the weather had become fine, a strong set to the S. E. occurred and brought down with it pieces of wreck, painted yellow and white, also quantities of dried cocoanuts,* but the most remarkable sight was the quantity of dead wild fowl, such as ducks, snipe, curlew and others ; which poor birds were literally, I believe, pressed into the sea by the sheet of falling rain I have before mentioned, many of them were about us during the gale, but could not fetch on board. There was no forked lightning during this breeze but occasionally bursts of *light*, N. E. and S. E. like the "Northern Lights" in Europe! The Temperature of the atmosphere was also agreeable and almost constant, without any hot blasts. The crisis of the gale I should say was with us from 4 P. M. of the 22nd to 4 A. M. of the 23rd when the wind had gone round (southerly) to W. S. W. and then sulked itself out in decreasing squalls.

I have printed the following table entire, although some of the remarks are anticipated in the preceding letter. But the whole is so complete a register of the passage of a Cyclone close to the Light Vessel and of the various atmospheric disturbances and signs attending it, that I would not change any part of the record. Mr. Ransom in a subsequent letter says his Sympiesometer continues to increase in difference from the other instruments, so that it may have been a little deranged at the time of the Cyclone.

* Which Mr. Ransom supposes must have been from the wreck of a Maldive boat.

Date.	Time.	Ther.	Barometer by J. Newman.*	Aneroid by E. J. Dent No. 5067.	Sympiesometer by Troughton and Simms.	Direction of Wind.	Remarks.
Oct. 18th	8 A. M.	85.0	30.136 Ins.	30.18 Ins.	30 60 Ins.	Calm.	Daylight calm and sultry; clouds collecting to the N. E. noon a fresh squall from the Northward, going to the Eastward; heavy rain, thunder and lightning. P. M. dark cloudy weather, wind moderate, Sea smooth.
	2 P. M.	82.30	29.926	,, .10	,, .57	North to East.	
	8 P. M.	83 30	,, .996	,, .15	,, .66	E. N. E. to E. S. E.	
19th	8 A. M.	82.00	,, .966	,, .15	,, .68	North to E. S. E.	Increasing Breezes, and squally weather; wind variable from North to E. S. E. P. M. The squalls gathering strength, veered to 100 fms. cable
	2 P. M.	82.00	,, .886	,, .07	,, .55	E. S. E.	
	8 P. M.	83.00	,, .956	,, .12	,, .66	E. S. E.	
20th	8 A. M.	81.00	,, 966	,, .15	,, .70	E. S. E.	Increasing Breezes with frequent hard squalls and heavy rain during them, sea beginning to rise, sent down top gallant masts and rigging.
	2 P. M	79.30	,, .856	,, .07	,, .60	E. S. E.	
	8 P. M.	80.30	,, .876	,, .07	,, .62	E. S. E.	
21st	8 A. M.	81-00	,, .846	,, .04	,, .57	E. S. E. to S. E.	Blowing hard E. S. E. to S. E. wind unsteady at times and gusty, clouds dense, atmosphere dark and gloomy, evident symptoms of worse weather approaching; veered to 160 fms. cable and made all preparations.
	2 P. M.	81.30	,, .776	29 98	,, .48	S. E. to S. S. E. back.	
	8 P. M.	81.30	,, .806	30.00	,, .56	to S. E.	
22d	8 A. M.	81.00	,, .786	29.98	,, .54	E. S. E. to S. E.	Blowing a gale, (not hard) but hourly increasing; a very high Sea coming in from S. E. Noon blowing a heavy gale, and the Sea breaking dangerously.
	10 A. M.	80.45	,, .756	,, .96	,, .54	S. S. E.	
	Noon.	80.45	,, .666	,, .90	,, .46	South.	
	2 P. M.	80.45	,, .566	,, .87	,, .44	,,	P. M. A severe gale and tremendous cross Sea, the rain which fell in the squalls now was more like sheets of water, Sent down everything from aloft that would hold wind. *several extraordinary flashes of light in the S. E. and N. E. similar to the Northern lights.*
	4 P. M.	80.30	,, .536	,, .85	,, .38	,,	
	6 P. M.	80.20	,, .556	,, .83	,, .36	,,	
	8 P. M.	80 20	,, .656	,, .88	,, .45	S. S. W.	
	10 P. M.	80.00	,, .606	,, .85	,, .40	S. S. W.	
	Midnt.	80 00	,, .556	,, .80	,, .34	S. S. W.	
23d	2 A. M.	80.00	,, 556	,, .80	,, .34	S. W.	A severe gale, with a high dangerous breaking Sea running, several broke on board, that did no damage, beyond driving in a bulls eye. From 4 P.M. of the 2nd to 4 A.M. of 23d I consider we had the hardest of this gale, and when the wind got to the W. S. W. the Sea was heavy and pyramidical, causing the vessel to labor much, but throughout the whole of the breeze she did not start an inch from her anchorage, the Floating Light buoy bearing the same when the weather broke, as at its commencement. The Salween P. V. drove about 2 miles to the N. E. with the W. S. W. part of the breeze.
	4 A. M	80.00	,, .606	,, .82	,, .36	S. W.	
	6 A. M.	80.00	,, .646	,, .85	,, .45	S. W.	
	8 A. M	80 00	,, .656	,, .86	,, .47	S. W.	
	10 A. M.	80.00	,, .676	,, .88	,, .52	W. S. W.	
	Noon.	80 00	,, .656	,, .87	,, .48	West.	
	2 P. M	80.00	,, .666	,, .88	,, .48	W. N. W.	
	8 P. M.	79.30	,, .806	,, .99	,, .57	N. W.	
			Depression.	Depression.	Depression.		
21st	8 P. M.		29.806	30.0	30.56		
22d	4 P. M.		29.536	29.80	.34		
	Fall in	20 hs.	.270	in 28 hs. 20	in 28 hs. 22		

* Correction of +0·056 made to the original, being that required by a comparison with the Standard.—H. P.

Abridged Extract from the Log of the H. C. Floating Light Vessel HOPE, *Commander* H. HILLER; *at the Saugor Point Station—Civil Time.*

21*st Oct.* 1852.—A. M. moderate N. East winds, cloudy and rain; 8 A. M. stronger winds; dirty looking weather. Noon wind increasing at East cloudy and squally with passing showers. 4 P. M. strong S. S. E. winds and cloudy dirty weather with frequent heavy squalls: sunset the same; 8 P. M. blowing hard at S. E. b. S. attended with heavy squalls, thunder, lightning and rain and a heavy sea; 10 P. M. veered to 115 fathoms cable. From 9 P. M. to midnight heavy gale at S. S. E. attended with a heavy sea and heavy gusts, and cloudy dirty weather with rain. Aneroid morning* (9 A. M.?) 30.40; Ther. 75°;† Bar. A 29.80; Ther. 80°; Bar. B 29.85; Ther. 81°. Noon Aneroid 30.37; Ther. 74°; Bar. A 29.75; Ther. 80°; Bar. B 29.85; Ther. 82.° Night (8 P. M.?) Aneroid 30.75; Ther. 78°; Bar. A At 29.70; Ther. 80°; Bar. B 29.81; Ther. 80.°

22*nd October.*—Strong S. S. E. gales, heavy sea, squally and rain to 8 A. M. Daylight to noon, the same, with thick dirty cloudy weather. Sunset, gale increasing to a hurricane attended with heavy squalls, and a heavy sea. At 6 P. M. driving, let go the second anchor, but the chain of the larboard anchor fouling and cutting the coir cable slipped it, 8. P. M. wind S. S. E. midnight a complete hurricane at S. S. E. with heavy squalls and a heavy sea with thick weather. Aneroid morning 30.40; Ther. 75°; Bar. A 29.81; Ther. 86°; Bar. B 29.85; Ther. 82°; 8 A. M. Aneroid 30.35; Ther. 76°; Bar. A. 29.75; Ther. 84_0; Bar. B 29.80; Ther. 82°; 4 P. M. Aneroid 30.20; Ther. 76°; Bar. A 29.51; Ther. 85°; Bar. B 29.75—82. Midnight, Aneroid 30.10; Ther. 75°; Bar. A 29.10; Ther. 82°; Bar. B 29.10; Ther. 80°.

23*rd Oct.*—A. M. Blowing a complete hurricane at S. S. E. with terrific squalls and thick weather, heavy rain and sea. 1 A. M. a heavy squall struck the vessel and laid her on her beam ends washing away quarter boat; 8.40 A. M. vessel took the ground striking heavily; weather, so thick that no land could be seen; 8 A. M. hurricane "*shifted* to the westward with terrific squalls;" 9 A. M. cleared a little, found her on shore, a little to the northward at Fakeer's Creek with 4 feet water in the hold. Three men of a Maldive vessel with 42 hands on board, which had foundered, and the crew of the Barque *Bengalee*, came in sight. Noon more moderate at West; 8 P. M. strong W. N. W. winds. From A. M. to 4 A. M. the Aneroid fell from 30.10

* Morning and night; so given throughout! I suppose at 9 A. M. and 8 P. M. are meant?

† So in MSS.

to 29.50 and then commenced to rise gradually. Barometer fell from 29.10 to 28-33 ; and then commenced to rise gradually.

Abridged Log of the Ship VIRGINIE, CAPT. JURAS, *from Calcutta bound to Madras and proceeding down the River. Log from Mr. Mate Pilot Alfred Bond. In Saugor Roads.*

21*st Oct.* 1852.—At anchor in Saugor Roads. Fresh breezes from E. b. N. to East, and E. S. E. with hard squalls and heavy rain throughout the 24 hours. Bar. at midnight 29.75. Noon 29.76. Midnight 21st—22nd 29.68.

22*nd Oct.*—Midnight strong breezes S. East ; and cloudy ; Bar. 29.68 at 1 A. M. ; at 4 A. M. 29.65 ; at 8 · 29.60. At 6 A. M. wind S. E. b. E. Increasing bad weather appearances to Noon. All preparations made for it. 1 P. M. Bar. 29.57 ; 3h. 29.55 ; at 4h. 29.54 ; at 7h. 29.50 ; at 9h. 29.47 ; at 11h. 29.37 ; at midnight 29.30. At sunset thick and hazy with heavy banks of clouds to the south ; sun of a pale brick colour ; 9 P. M. driving ; let go a second anchor ; 11 P. M. gale increased to a hurricane blowing in terrific gusts, with a high short sea making a complete breach over all. At 11.40 cut away fore and main masts for the safety of the ship, lost bowsprit and mizen topmast.

23*rd Oct.*—Midnight the wind terrific, and to be compared to nothing but howlings and shriekings ; the sky black, the sea rising in large masses in appearance like a wall approaching the ship, of a dull glowing muddy colour. The spray a continued sheet passing over the ship ; 3 A. M. the height of the hurricane, gusts terrific, blowing away the boats, &c. ; sea rising in pyramids, ship rolling deeply and nearly foundering at her anchors during the night ; having 7 ft. water in the hold and throwing cargo over board. During these 24 hours the wind is marked at 1 A. M. South ; at 2h. S. S. W. at 3h. West ; at 5h. W. b. N. ; at 6h. W. N. W. ; at 7h. N. West ; at Noon North ; at 2 P. M. N. b. E. ; at 5h. N. N. E. ; at 7h. N. E. ; at 8h. East and at 9h. S. East to midnight again. The Barometer is carefully registered for this day as follows :—

1 A. M.	29.14.	1 P. M.	29.47.
2	28.80.		49.
3	65.		53.
4	68.		53.
5	82.		54.
6	29.10.		54.
7	22.		55.

8	A. M.	2930.	
9		33.	
10		39.	
11		43.	
12		45.	
1	P. M.		29.55.
			55.
			56.
			57.
			57.

Thermometer not marked.*

Before daylight observed several broad glaring patches in the sky, of a pale reddish colour. Daylight hurricane, but steady, not in gusts; ship a complete wreck. 6 A. M. the wind from a hurricane decreased to a severe gale in heavy gusts, the sea a heavy surf sweeping the decks continually and destroying and carrying every thing before it. At 10 A. M. decreasing with a partial break in the sky. Noon clearing up. An American ship and the Barque *Bengalee* at anchor with loss of main and mizen masts, and the Floating Light on shore.

Abridged Statement from the American "Ship WM. STURGIS" *in Saugor Roads outward bound.—Civil Time.*

On Sunday the 19th Oct.—Came to anchor in Saugor roads and discharged steamer. On the 20th and 21st remaining at anchor in Saugor roads, weather squally and threatening, with rain and thunder and lightning.

Oct. 22nd.—Commences with heavy rain and moderate easterly breezes. At 2 P. M. wind increasing, made all preparations; 6 P. M. let go the starboard anchor and veered away on both cables; day ends with violent gales from E. to S. E. by S. with heavy rain.

Oct. 23rd.—Commencing this day at midnight; veered out the whole of both bower cables, gale increasing and a heavy sea bearing in from the southward. At 2.30 A. M. the wind veering from E. N. E. to S. and blowing with terrific violence, the ship commenced driving with both anchors; at 3 A. M. the ship still driving broadside to the wind. Mizen sands close to leeward, lee rail under water and the sea breaking over fore and aft, it was deemed proper to cut away the masts as the only means of saving ship cargo and lives on board.

The main and mizen masts were immediately cut away but the ship continued to drive. Then cut away the weather fore topmast back stays, and when the topmast fell over the side the anchors took effect, bringing the ship head to wind, fetching the bows under and sweeping her decks fore and aft; sounded in $4\frac{3}{4}$ fathoms. From this time until daylight, employed clearing the wreck. At 6 A. M. *the wind lulled for a few moments and then struck*

* I was unable to obtain any comparison with this ship's Barometer and the Standard.

from S. W. blowing with increased violence until 9 A. M. when the gale broke with wind at N. W.

Abridged Log of the Peninsular and Oriental Company's Steam Ship PRECURSOR, *Capt.* GRIFFIN, *at Cowcolly during the Cyclone.—Civil Time.*

On the 22nd Oct. 1851.—At 9.45 A. M. anchored, with Cowcolly bearing West and lower Buoy of the Auckland Channel E. S. E. in $8\frac{1}{4}$ fs. wind at E. S. E. Heavy rain and thick windy weather. Bar. at 8 A. M. 29.905;* at Noon 29.80; Ther. 80°. P. M. heavy rain, wind E. S. E. to S. E. and at 4 P. M. E. S. E. Bar. at 4 P. M. 29.945; 6 P. M. ship had dragged a little, wind blowing strong in squalls; at 8, Cowcolly light W. $\frac{3}{4}$ S. About 9 P. M. light not visible, increasing gale to midnight. Bar. at 8 P. M. 29.785; Ther. 78°; at 11h. 29.385; midnight 29.285; hard gale with very strong gusts S. E. to S. S. E.

23rd Oct.—Gale increasing, stern boat blown to pieces; 2 A. M. terrific squalls of wind and rain. Wind marked as S. Easterly to Noon; steaming full power ahead to relieve strain on the cables which were both veered out and both ahead. At 3.30 A. M., during a perfect hurricane, both cables parted and at 4, grounded on the mud bank carrying away the rudder. At 4.30 A. M. wind suddenly lulled having been steady at S. S. E. but at 5, blowing furiously from N. E. to N. West. 4.30 A. M. [†Barometers rising astonishingly fast; "5, wind lulled. Set on, but wind chopped round suddenly to N. N. E. veering to N. W. blowing harder than before. Reversed the engines to keep the vessel on the bank, it being evident to all on board that had she been blown off the flat, no anchors could have held her and she must have been driven on to the Reefs, the Long sand, or the Mizen."†] At 9 A. M. the wind again lulled and a moderate breeze commenced from N. W. Vessel on shore, with Cowcolly light house bearing W. S. W. Got afloat on the 24th. Barometer for this day as follows:

	Bar.	Ther.		Bar.	Ther.
1	A. M. 29.175	78°	6	A. M. 28.835	78°
2	28.955	..	7	.985	..
3	.685	..	8	29.085	78°
4	.585	..	9	.395	..
5	.685	..	Noon	.915	82°

* The Barometer is corrected throughout by the addition of + 0.085 being its error by a comparison with the Standard. Some additions are made to the log from a MS. report of the Pilot, Mr. Beaumont.

† Pilot's notes within these brackets and † s.

Abridged Log of the H. C. Buoy Vessel GRAPPLER, *Mr. Branch Pilot,* J. H. CHALKE, *at Kedgeree.—Civil Time.*

The H. C. Buoy Vessel *Grappler* was also blown on shore close to the *Precursor*, and Mr. Chalke has favoured me with a precise report with an excellent series of Barometric Observations, and a comparison for their correction.

Extracts from the H. C. B. V. Grappler's Log of the 21*st*, 22*nd and* 23*rd October, at anchor in Kedgeree Roads.*

*Barometer.**			*Winds, weather and other remarks on the* 21*st October.*
6.30	A. M.	29.878	Fresh N. E. to East with squalls and rain first part.
10.30	,,	29.870	Latter part hard squalls from east to S. E. with rain.
4.00	P. M.	29.828	
8.00	,,	29 848	
Barometer.			*22nd October.*
6.00	A. M.	29.848	A. M. hard squalls from eastward with rain, to 7.0 P. M.
10.30	,,	29.873	blowing in squalls with thick rain from E. N. E. to S. E.
3.00	P. M.	29.758	To midnight severe gales from S. E. to E. N. E., hard
4.00	,,	29.708	squalls of dense thick impenetrable rain.
5.00	,,	29.658	
6.00	,,	29.608	
7.00	,,	29.508	
8.00	,,	29 478	
9.00	,,	29.388	
10.00	,,	29.368	
11.00	,,	29.228	
12.00	,,	28 988	
Barometer.			*23rd October.*
1.00	A. M.	28.888	A. M. 2.00 blowing a gale from S. E. to E. N. E. increas-
2.00	,,	28.688	ing in strength every moment with dense rain 4.00. A. M.
3.00	,,	28.748	blowing a hurricane, it being impossible to move on
4.00	,,	28 978	deck to windward. Dense rain 6.00 A. M. moderating
5.00	,,	29.028	and veering to the northward. At whence it suddenly
6.00	,,	29.288	came down with fearful violence from the N. N. West-

* Corrected to the Standard (by —.012).—H. P.

Barometer.		
7.00	A. M.	29.388
8.00	,,	29.438
9.00	,,	29.468
10.00	,,	29.528
11 00	,,	29.578
12.00	,,	29.598
4.00	P. M.	29.658
8.00	,,	29.738

23rd October.

ward until 9.30 A. M. when it began to moderate coming round to W. N. W. Noon moderating considerably P. M. 4.00 fresh. W. by N. breeze.

J. H. CHALKE,
Commander, Grappler.

A Register of two Barometers; one by Calderara the other by Troughton and Simms; a Sympiesometer with Thermometer attached by Troughton and Simms; and an Aneroid by Dent; during the Hurricane of October 22nd and 23rd, 1851, by Mr. B. Pilot, A. BEDFORD, River Surveyor, H. C. Surv. Brig Megna, off Mud Point.

Date.	*Hour.*	*Ther.*	*Symp.*	*Aneroid.*	*Calderara Bar.*	*T. and Simms Bar.*	*Wind.*	*Remarks.*
					+0.227 Corr.	+0.024 Corr.*		
1851 Oct.								
21st	8 A. M.	79°.	30.88	30.08	29.75	30.01	N. E.	Moderate breeze and cloudy.
	2 P. M.	80.	30.78	30.02	29.73	30.00	Ditto.	
	8 P. M.	80.	30.76	30.02	29.73	30.00	Easterly.	Very gloomy and threatening all round with passing squalls from the eastward.
22nd	6 A. M.	79.5	30.68	29.92	29.60	29.90	East.	Squalls, with thick hazy weather.
	8	79.5	30.74	29.97	29.68	29.92	Ditto.	Ditto ditto.
	10	79.5	30.74	30.00	29.68	29 93	Ditto.	Ditto ditto.
	12 Noon.	78.5	30.70	29.95	29.66	29.90	Ditto.	Much rain, very hazy.
	2 P. M.	78.0	30.62	29.90	29.60	29.86	N. E.	Hard squalls with much rain.
	4	78.0	30.60	29.85	29.57	29.81	E. N. E.	
	6	78.5	30.58	29.82	29.54	29.78	S. S. E.	Gale commenced.
	8	79.4	30.55	29.82	29.53	29.79	Ditto.	Gale, hard gusts.

* Mr. Bedford's table is given as it reached me to allow of the comparison with the Sympiesometer. To compare his Barometer with others, the corrections marked must be made. I regret being unable to give his valuable projection but I shall use it in another place.—H. P.

Date.	*Hour.*	*Ther.*	*Symp.*	*Aneroid.*	*Calde-rara Bar.*	*T. and Simms Bar.*	*Wind.*	*Remarks.*
	10	79.8	30.50	29.80	29.50	29.76	E. S. E.	Hurricane with occasional lulls, spitting rain with heavy scud.
	12	80.0	30.44	29.72	29.45	29.70	East.	
23rd	1 A. M.	79.8	30.38	29.66	29.39	29.62	Ditto.	
	2	79.5	30.32	29.60	29.32	29.56	E. b. S.	
	3	79.2	30.24	29.51	29.25	29.47	Ditto.	
	4	79.0	30.08	29.40	29.14	29.34	E. S. E.	From 4 to 6 was the hardest part of the hurricane, it was screaming the most fearful note I ever heard. Vessel often with her lee rail under water, *gradually* pressed down by force of wind only, lower masts bending like twigs, sky and water mixed, forming a mad boiling surge in which we were helpless.
	5	79.0	29.88	29 18	28.94	29.18	Ditto.	
	6	79.0	29.56	28.80	28.60	28.78	Ditto.	
	7	79.0	29.52	28.85	28.65	28.81	Ditto.	At 7 it moderated for a short interval
	8	79.0	29.73	28.92	28.70	28.92	North.	A *Sudden* shift, and blew as hard as ever.
	9	78.8	30.05	29.30	29.06	29.32	N. N. E.	Slightly moderating.
	10	78.5	30.28	29.56	29.25	29.50	Ditto.	Much more moderate.
	11	78.5	30.40	29.62	29.35	29.60	N. N. W.	Ditto ditto.
	12 Noon.	78.0	30.47	29 68	29.39	29.63	Ditto.	Close reefed, topsail breeze.
	1 P. M.	78.0	30.50	29.70	29.43	29.66	N. W.	Sea going down fast
	2	78.0	30.53	29.72	29.45	29.70	NW h. W.	Fresh breeze.
	3	77.7	30.53	29.76	29.47	29.71	N. W.	Ditto and clear.
	4	78.0	30.55	29.78	29.48	29.73	Ditto.	More moderate.
	5	78.3	30.58	29.80	29.49	29.77	W. N. W.	Clearing away fast.
	6	78.2	30.62	29.82	29.53	29.80	West.	Moderate breeze and fine.
	8	78.0	30.62	29.85	29.58	29.83	Ditto.	Ditto ditto.

The vessel's position when the above were taken. was about 1½ miles S. W. of Mud Point, they were all either taken, or their accuracy ascertained by myself. Some latitude must however be given for the direction of the wind which I found difficult to obtain, except when it was right ahead. I do not think the error would amount to more than one or two points.

The projection of the above register would seem to shew that the Aneroid will bear a very fair comparison with the Sympiesometer in these gales, both in its range and sensitiveness it was when first received regulated by the standard Barometer at the Surveyor General's Office. The Sympiesometer, you may observe, is a very high one.

A. Bedford,
River Surveyor, Commdg. Megna Steam Vessel.

Abridged Log of H. M. S. Fox, *Commodore* G. Lambert, *lying at Diamond Harbour.—Civil Time.*

22*nd Oct.*—A. M. overcast, showery and gloomy. Wind Easterly (3).* 8 A. M. (2) the same weather, Bar. corrected 29.805; Noon 29.715; Ther. 70°. P. M. wind easterly (6) weather as before; 5 P. M. Bar. 29.685; Ther. 80°; 6 P. M. wind S. easterly (7); 8 P. M. east (9). Overcast, squally, rain, and thunder and lightning; midnight the same force (10); Bar. 29.585; Ther. 79°.

23*rd Oct.*—A. M. rain, squally and thick weather. Wind E. S. E.; force (10) to (11) and (10) again at 4 A. M. Bar. at 1h. A. M. 29.555; at 2h. 29.535; at 3h. 29.485; at 4h. 455; 2 A. M. down top gallant masts, and at 7 A. M. pointed yards to the wind, ugly weather; veered to 80 fs. cable. At 8 A. M. wind N. E. (10) Bar. 29.385; at 9h. 29.375; at 10h. 29.375; at 11h. 29.435; at Noon 29.455; Ther. 78°; at 10 A. M. wind North (10); Noon N. N. W. (10); P. M. N. W. b. N. (9). Overcast, misty, gloomy, and rain; at 4h. N. W. b. N. (8); at 6, N. W. b. N. (6). Bar. at 2 P. M. 29.505; at 4h. 29.555; at 6h. 29.635; at 8h. 29.655; at midnight 29.705. Clear and cloudy.

The following are my own observations at Calcutta, the Barometer being corrected to that of the Surveyor General's Office but with no correction for Temperature, &c.

Wednesday, 22*nd Oct.* 1851.—For the last two days weather suspicious with light drizzling showers; heavy overcast sky, breaking at times into clear blue spaces, varied by cirri and cirro-strati

21*st Oct.*—Wind in light squalls and puffs from N. to N. E. scud from East and N. East.

22*nd Oct.*—At $6\frac{1}{4}$ A. M. light squally breezes and puffs N. to N. N. E. and N. N. W. Scud thick and frequent, and a low smoky scud below all from the N. East, driving moderately, but not *very* fast, Bar. 29.859; Symp. 29.95; Ther. 79°. Scud at times from the S. E. and arched squalls, with very little wind in them, from the Eastward.

9 A. M. Bar. 29.959; Symp. 30.00; Ther. 79°. Calm. Heavy banks to S. E. and South.

5 P. M. squally breeze from N. East with light rain. Sky overcast, low smoky scud, travelling rather rapidly from N. E.; heavy rain. Bar. 29.829; Symp. 29.90; 6h.10′ P. M. the same as at 5 P. M.; 7h. P. M. Bar. 29.819; Symp. 29.91. Ther. 79°.

23*rd Oct.*—6 A. M. Bar. 29.719; Symp. 29.83; Ther. $78\frac{1}{4}$°. Blowing a fresh steady gale from E. N. E. to N. E. with continued rain during the night, wind and rain gradually increasing. Scud from E. b. S. and E. S. E. ½ P.; 8 A. M. gale force (8—9) E. N. E. to E. b. N. strong squalls and rain. Scud from about East.

* Force by Admiral Beaufort's scale. The Barometer is corrected by a careful comparison with the standard giving —0.015 as the correction.

9h.15′ A. M. Bar. 29.679 ; Symp. 29.80 ; Ther. 78°. Wind N. E. (8—9). Squalls strong (9—10). Scud from N. East! 10h.15′ A. M. Bar. 29.579 ; Symp. 29.78 ; Ther. 78°.

11h.15′ Bar. 29.629 ; Symp. 29.78 ; Ther. 78¼°; Noon Bar. 29.639 ; Symp. 29.77 ; Ther. 78¼°. Squalls less severe and less rain with more light at times ; clouds more in masses. Wind N. b. E. ! Scud from N. East.

1 P. M. Bar. 29.629 ; Symp. 29.76 ; Ther. 78¼°. Scud from N. N. E. Wind North and N. b. W.

2 P. M. Bar. 29.609 ; Symp. 29.76. Scud from N. b. E. Wind North to N. W. !

3 P. M. Bar. 29.619 ; Symp. 29.78 ; Ther. 78½°. Wind much abated and N. N. W. to N. W. but the scud still from N. b. E. Clouds darker but less rain.

4 P. M. Bar. 29.629 ; Symp. 29.79 ; Ther. 78¼°. Scud from North. Wind N. W. to N. N. W.*

7 P. M. wind about N. W. and in slight squalls only, Bar. 29.739 ; Symp. 29.85 ; Ther. 78°.

Surveyor General's Office.

The following table is extracted from the monthly register kept at the Surveyor General's Office. Bar. corrected to 32° Fahrt.

Time of Observation.

Date.	Sunrise.		9 h. 50 m.		Noon.		2.40 P. M.		4 h. P. M.		Sunset.	
	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.	Barometer.	Thermometer.
1850 Oct.		o		o		o		o		o		o
19th	29.868	78.3	.922	83.6	.863	85.0	.798	84.0	.806	81.2	.831	79.0
20th	.849	77.4	.884	80.6	.819	82.6	.855	79.0	.751	79.2	.759	78.6
21st	.777	76.6	.819	81.3	.776	77.8	.719	78.5	.710	80.0	.722	79.0
22nd	.752	76.8	.806	78.7	.765	75.5	.692	75.3	.667	76.2	.663	76.2†
23rd	.564	76.0	.520	70.6	.475	76.6	.488	78.0	.515	77.6	.555	78.0
24th	.705	75.6	.771	80.0	.730	83.0	.662	86.0	.668	85.8	.679	83.8
25th	.791	77.8	.863	84.3	.819	86.2	.771	87.4	.764	86.3	.812	83.8

* These are the same points as in the preceding entry, but the order of them is designedly changed to express that *generally* the wind was from the first point or N. W., but at times, either from incurving or from the eddies over a town, veering to N. N. W. : so in the entry at 3 P. M. N. N. W. to N. W means that generally the wind was N. N. W., but at times N. West.

† Fall of rain nearly 12 inches.

Substance of letters from Noacolly in Lat. 22.53′ *N. Long.* 90.54′ *East. Communicated by Dr.* BAKER.

No. 1. "We have had one of the most severe hurricanes that has been known here since 1829. It commenced about 6 o'clock on the evening of the 23rd; increasing till midnight when it blew a complete hurricane until 5 A. M. of the 24th; the damage done and loss of life is said to be very great. It commenced from the S. E. passed on the South and terminated with the wind at S. W.

No. 2. "Hatteah and Sundeep* have escaped pretty well, but Siddee (an island between Sundeep and the mainland) and Bouring on the mainland have suffered considerably in crops, cattle and some loss of inhabitants.

No. 3. "Since my last I have seen a letter from Chittagong. The gale was much more moderate at that place. They had very high tides and squally weather, not amounting to a gale, on the 23rd and 24th. Accounts from Noacolly continue to add to those received of the devastations of the Cyclone in that quarter. The loss of human life is very great. Nearly two hundred corpses were counted in the creek leading up to the station. They had floated up with the tide, with numbers of cattle, deer, tigers, buffaloes, &c."

CHITTAGONG.

Letter from A. SCONCE, *Esq., C. S., Judge of Chittagong.*

"In case no account of our Chittagong weather during the late Cyclone may have reached you, perhaps my notes may be acceptable.

"The weather being previously fine, a change was first observable on the afternoon and evening of the 18th Oct.; there was a heavy, dirty looking bank to Southward. At night it rained; rained almost all the 19th lightly; with little wind S. to S. E. 21st and 22nd overcast with clouds: air still or nearly so; on 23rd wind at S. E. Morning and forenoon, heavy clouds rising W. and S. W. veering to N.; at noon heavy in the N. W. and thundering.† From 1 to 3 P. M. wind S. to S. E. squally with rain; evening squalls heavier: before midnight, wind rose; blew very strong (apparently) S. E. perhaps *nearer* E. then to S. and so far as I could observe from 4 A. M. of 24th veered round to S. W.; at 6 A. M. of the 24th blew strong from S. W.; at breakfast, wind began to fall. On the 23rd, 3.18 inches rain fell. My Barometer being broken, I can give no account of it.

* Islands at the mouth of the Burrampooter.

† This is worthy of note.—H. P.

"The only point which this statement may be found perhaps usefully to illustrate is this, that the gale or Cyclone took 24 hours to come from Kedgeree to Chittagong. The *Precursor* had it on the night of Wednesday, we had it on the night of Thursday."

Extract of a letter from E. Craster, *Esq. Acting Collector of Chittagong.*

"The weather for some days previous to the 23rd Oct. had been gloomy and threatening with occasional falls of rain, not, however, in any great quantity, the Southern horizon in particular continuing overcast with a mass of heavy leaden-coloured clouds; and men of experience on the coast predicted the occurrence of a gale, fixing the probable period as about that of the change of the moon.

On Thursday the 23rd Oct. the wind blew pretty fresh throughout the day from the Southward, gradually increasing as the evening closed in, rain also fell occasionally, but more in the form of driving mist, than that of actual rain.

About 10 P. M. the wind freshened up suddenly from about S. E. by South, and at that point the gale commenced, accompanied with a heavy fall of rain; it continued increasing in violence until about 2 A. M.; when it appeared to have attained its height, the direction of the wind gradually changing from the point at which the gale commenced, and drawing round by South towards West, from which last quarter it was blowing hard at 7 A. M.; after this time the gale abated; a moderate breeze from the North-West continuing throughout the day. The quantity of rain which fell during the gale was 3 inches 23 cent."

In a subsequent letter, in reply to some enquiries, Mr. Craster informs me that the Master Attendant's Barometers were at about 29.50. And he confirms also the foregoing accounts of the devastations occasioned by the high tide (Storm Wave?) along the Eastern shore of the Burrampooter; he says that three hundred persons and thousands of cattle are reported to have been drowned.

I now give for the purposes of ready comparison as usual, the comparative table of winds and weather with the different vessels and at the shore stations.

Comparative Table of Winds and Weather from the 20th to the 24th October 1851. *Precursor's Cyclone.*

Date.	*Name of Ship or Station.*	*Lat. N.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Symp.*	*Ther.*	*Remarks.*
1851. 20th Oct.	Ararat.....	16.28	86.58	Strong breezes and squalls, from West and South, increasing fast.	29.75 2 P.M. 67.	..	84	Barometer on the 19th 29.85. Rearward sea of the Cyclones at Noon from the N. W. 1.30 P. M. hove to, midnight hard gale.
	Easurain.....	15.25	91.56	P. M. moderate S. E. breeze and fine, moderate	29.15 29.30	..	..	Heavy S. W. swell.
	Georgina.....	21.4	88.40	8 A. M. Threatening to the S. E., Noon moderate, P. M. light squalls.	29.92 29.89	29.55 to 29.40	87 to 89	At anchor, and standing to Sea from the Sand Heads. Bank to S. E. with lightning.
	Schr. Orissa, Balasore River.....	21.28	87.12	Cloudy. Wind S. E.	29.66 falling.	..	..	Ran in to Balasore River for shelter.
	Lucknow; standing to sea	20.40	87.54	A. M. E. S. E. P. M. East, 10 P. M. N. E. increasing breeze.	..	..	..	Standing to the S. S. W. and South.
	H. C. P. V. Tavoy.	Eastern Channel. 20.4	88.27	E. S. E. Increasing breezes with heavy squalls and rain.	29.96 to 29.87	79½ to 81	..	Sea beginning to rise.

Date.	*Name of Ship or Station.*	*Lat. N.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Symp.*	*Ther.*	*Remarks.*
21st Oct.	Ararat.....	17.6	87.50	South at 5 A. M. S. S. W. again at Noon. P. M. S. S. W. to midnight when hard gale and squalls about South.	29.70	..	84	Ship running 8 to 10 knots to the North breaking up at 4 A. M.
	Easurain.....	17.4	90.33	Wind S. E. 7 and 8 knot breeze, P. M. South.	..	Bar. 29.93 5 P.M.95. 6h.88 8h.90 Mid. 88.	86	Very heavy S. W. swell. P. M. dangerous. cross sea W.N. W. to. S.W.
	Lord Petre.....	19,20	89.54	S. W. and S. b. E. A. M. squally; midnight strong gales.	A.M.29.86 P. M. .90 Mid. .86	..	78. to 77.	4 P. M. hove to, dark squally weather.
	Georgina.....	21.60	88.30	E. S. E. and S. E. b. E. breeze increasing throughout.	29.84 to 29.56	29.35 to 29.15	89	Barometer very unsteady, 10 A. M. suspicious to the Eastward and Southward. Standing to the S. W., clear over head, wild looking weather, heavy head sea from S. E. and S. W.; lightning.
	False Point Light House..	20.19½	86.59	Winds N. N. E., East and N. E. cloudy, light rain, heavy squalls increased to a strong gale.	..	29.85 to 29.50	..	Hazy; appearance of a gale. Scuds from N. E. and S. East crossing.
	Schooner Orissa, Balasore River.	21.28	87.12	Wind E. S. E. squally	29.60	..	..	No indications of a storm, but tide 2 hours in advance.

21st Oct.	Brig Scourfield Pilot Station. ..	..	..	Fresh S. Easterly breeze and squally.	..	..	..	Heavy swell from the Southward at night.
	Lucknow.....	19.9	87.43	2 A. M. strong gales N. E. increasing to Noon. P. M. wind had veered to N. W. at 8 P. M. S. W. Midnight stiff gales.	..	..	..	2 A. M. heavy sea from the Southward; 10 A.M. hove to, running to the S. and S. b. W. till that time, 6 P. M. moderating.
	H. C. P. V. Cavery	Proceeding down and to Sea.		E. b. S. to S. E. b. S. 11 A. M. S. E. b. S. Midnight E. S. E.	29.99 to 29.95	..	..	Lightning N. E. to N. W. at 8 P. M.
	H. C. P. V. Tavoy.	Eastern Channel. 21.4	88.27	Blowing hard E. S. E. to S. E. gusty and unsteady and at times S. S. E.	29.84 to 29.80	..	81 to 81.30	Atmosphere dark and gloomy. Signs of warm weather.
	H. C. F. L. V. Hope	Saugor Point. Station. 21.26	.. 88.07	A. M. moderate N. E., and increasing. Noon East; 4 P. M. strong S. S. E. winds 8 P. M. blowing hard S. E. b. S. Midnight heavy gale S. S. E.	29.82½ to 29.80 and 29.75	..	81 to 80	8 P. M. heavy squalls thunder, lightning and rain.
	Virginie... '.....	Saugor Roads.	..	Fresh breeze E. b. N. to E. S. E.	29.75 to 29.66	..	..	At Anchor.
	H. C. B. V. Grappler.....	Kedgeree. 21.52	.. 87.59	N. E. to East with squalls and rain. Latter part East to S. E. hard squalls.	29.88 to 29.85	..	..	

Date.	*Name of Ship or Station.*	*Lat. N.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Symp.*	*Ther.*	*Remarks.*
21st Oct.	H. C. Surveying Brig Megna.	Mud Point. 21.56	.. 88.07	N. East and Easterly.	30.03 to 30.02	..	..	Gloomy and threatening from the Eastward with passing squalls.
	At Calcutta....	22.35	88.21	Wind in light squalls and puffs N. to N. E.	..	..	..	Scud from East and N. E.
22d Oct.	Ararat.....	19.18	88 2	Southat 10 A. M., increasing. Noon hard gale; P. M. S. W. b. S. hard gale, to midnight.	29.66	..	87	Running up till daylight when hove to again. Dense black bank to the Westward.
	Easurain.....	19.38	89.55	Strong gales South: P. M. S. S. W. midnight hard gales S. S. W.	4 A. M. 29.89 6 .86 8 .90 Noon .88 Mid. .85	..	86	Cross sea threatening to W. S. W. Current to S. E. b. E. 16′. 4 P. M. hove to. Tremendous sea, S. W. to West.
	Lord Petre.....	20.02	89.20	Wind S. b E. to S. b. W. throughout; to 8 A. M. strong gales. Noon more moderate, P. M. Strong gales.	A. M. { 29.78 .80 P. M. .70	..	..	Squalls and much lightning.
	Georgina.....	..	..	4 A. M. very severe gale S. S. E. Noon S. W. b. S. P. M. S. W. b. S. midnight S. W.	29.53 to .48 and .69	29.10 to .04 and .25	86 to 84	10 A. M. severe squall, ship on her beam ends; wind veered to S. W. Noon in 35 fs. water. Midnight violent squalls and tremendous sea.

22 Oct.	False Point Light House.....	20.19½	86.59	2 A. M. E. N. E. 4 East 5 S. E. 7.30 stark calm and heavy rain; 9.30 complete hurricane at South; Noon S. W. 3 P. M. West.	29.45 to 28.50 and 29.70	..	..	2.30 A. M. sea made a complete breach up to the light house, 3 P. M. gale broke.
	Schooner Orissa, Balasore River.	21.28	87.12	Wind East and E. N. E. 3 P. M. E. N. E. to N. E. 6 N. E. to N. N. E. 9 P. M. N. W. to West.	29.50 P. M. 29.55 3 29.45 4 .40 5 .20 1 .10	..	..	Gale from 4 P. M. to 3 A. M. 23rd.
	Scourfield; Pilot Station and at sea.	..	..	Blowing hard from S. East with roaring gusts daylight hard gale, midnight moderate.	29.70 to 29.60 and .50	..	..	Daylight put to sea 4 P. M. on her beam ends, cut away masts and anchored.
	Lucknow.....	17.44	87.30	A. M. stiff gale S. W.	..	..	..	
	H. C. P. V. Cavery.	In 20 fs. to S.W. of station and at anchor about 20.44	87.20	E. S. E.; 2.30, oscillating from E. S. E. to S. E. till 2 P. M. when veered to S. S. W. 8 P. M. wind hauling to Westward, midnight moderate at W. S. W.	29.69 to 29.30 and 29.80	..	..	Heavy hurricane, E. S. E. to S. S. W. 4 P. M. Bar. began to rise.
	H.C. P. V. Tavoy.	Eastern 21.4	Channel. 88.27	Increasing gale. Noon a heavy gale; P. M. severe E. S. E. to South, Noon to 8 P. M. when S. S. W. to midnight.	29.76 to 29.53 and 29.55	81. to 80.	..	Very high sea from S. E. Noon breaking dangerously, P. M. tremendous cross sea, rain in sheets. Extraordinary flashes of light S. E. and N. E.

Date.	*Name of Ship or Station.*	*Lat. N.*	*Long. East.*	*Winds and Weather.*	*Bar.*	*Symp.*	*Ther.*	*Remarks.*
22d Oct.	H. C. F. L. V. Hope.	Saugor Point Station.	..	Strong S. S. E. gales to Noon; increasing to hurricane at sunset. 8 P. M. S. S. E., midnight the same. Hurricane.	29 83 to 29.10	80 to 75	..	Heavy squalls and sea throughout.
	Virginie.....	Saugor Roads.	..	S. E. to S. E. b. E.	29.68 to 29.30	..	..	Sunset heavy banks to South 11 P. M. hurricane 11.40 cut away masts.
	P. and O. Str. Precursor.....	Kedgeree. 21.52	.. 87.59	9.45 wind E. S. E. heavy rain and thick windy weather. Noon E. S. E. to S. E. 4 P. M. E. S. E. midnight S. E. to S. S. E. hard gale.	29.90 to 29.28	80 to 78	..	From 8 P. M. to midnight, gale increasing fast.
	H. C. B. V. Grappler.....	Kedgeree.	..	A. M. hard squalls from Eastward to 7 A. M., squalls and thick rain E. N. E. to S. E. To midnight, severe gales.	29 85 to 29.83	..	..	Hard squalls of dense thick rain.
	H. C. Surv. Brig Megna.....	Mud Point. 21.56	.. 88.07	East to Noon then N. E., E. N. E. and S. S. E. and at 10 P. M. E. S. E. to East, hurricane.	29.92 to 29.72	..	..	Weather increasing gradually to hurricane; gale commenced at 6 P. M.

22d Oct.	H. M. S. Fox....	Diamond	Harbour.	Wind Easterly (3.) P. M. the same (6.) 8 P. M. East (9.) Midnight East (10.)	29.80 29.71 and 29.56	..	79.	Gloomy squally weather throughout with thunder and lightning at 8 P. M.
	At Calcutta....	..	..	6 A. M. light squalls and puffs N. to N. N. E and N. N. W. 8 P. M. squally breeze from N. E.	29.86 to 29.96 and 29 82	29.95 to 30.00 and 29.91	79.	Scud thick and frequent, and a low smoky scud below all from N. E.
23rd Oct.	Ararat.....	19.30	88.5	9 A. M. S. S. W. Noon hard gale; 3 P. M. W. S. W. b. W. 6 P. M. W. S. W. moderating.	29.68	..	86.	
	Easurain.....	20.11	89.41	Daylight hard gale S. to S. S. W. the same throughout.	4 A. M. 29 84 Noon .85 2 P. M. .80 6 .76	..	84.	Lying to. Sunset, remarkable red sky to Westward.
	Lord Petre.....	20.29	89.14	Wind S. b. W. to W. S. W. 6 A. M. Hurricane till 9 A. M. Noon fresh gale.	{ 29.70 { .74 to .78	..	..	Midnight dark squally appearance to the S. W. with much lightning.
	Georgina.....	25 miles S. of Floating light.	..	A. M. gale appears broken, wind S. W., Noon moderate.	29.68 to 29.81	..	..	8 P. M lightning to the westward, midnight squalls, rain and thunder and lightning to the eastward.
	False Point Light House..	20.19½	86.59	Wind West and fine weather.	29.70 to 29.72	..	..	

Date.	Name of Ship or Station.	Lat. N.	Long. East.	Winds and Weather.	Bar.	Symp.	Ther.	Remarks.
23d Oct.	H. C. P. V. Cavery	20.44	87.20	Variable West to N. N. W.	29.90	..	..	Towards morning much lightning to the S. W.
	H. C. P. V. Tavoy.	Eastern Channel. 21.4	88.27	To 4 A. M severe gale and S W. wind to 8 A M. when W. S. W.; at 10. West at Noon; W. N. W. at 2, and N. W. at 8 P. M.	..	..	..	Severest part of gale from 4 P. M. 22nd to 4 A. M. 23rd
	H. C. F. L. V. Hope	Saugor Point Station.		A. M. hurricane S. S. E. 8 A. M. hurricane *shifted* to the Westward with terrific squalls.	29.10 to 28.33	..	..	1 A. M. Vessel on her beam ends and driving 8 P. M., grounded.
	Virginie.....	Saugor Roads.		1 A. M. South, 2 S. S. W ; 3 West; 6 W. N. W.; 7 N. W. Noon North 2 N. b. E.; 5 N. N. E.; 8 East. 9 S. East to daylight. Hurricane but steady, 6. A. M. moderating to severe gale.	29.14 to 28.65 and 29.57	..	..	Midnight wind terrific. Nearly foundering; daylight bright glaring patches in sky.
	P. and O. S. N. Comp.'s Str. Precursor.	Kedgeree.	..	Wind steady at S. S. E. to 4.30 A. M. when lulled; at 5, shift from N. N. E. to N. West.	28.83 to 29.91	..	78. to 82.	2 A. M. terrific hurricane; 4 A. M. grounded, 9 A. M. wind lulled and continued moderate at N. W.

23d Oct.	H. C. B. V. Grappler.	Kedgeree.	..	2 Gale from S. E. to E. N. E. increasing every moment; 4 hurricane. 6. A. M. moderating and veering to the Northward and again suddenly bursting out from N. N. W. At 9.30 had veered to W. N. W. always moderating 4 P. M. fresh N. West and breeze.	29.89 to 29.03 and 29.74	..	..	
	H. C. Surv. Brig Megna.	Mud Point.	..	1 A. M. East; 2 E. b. S.; 4, E. S. E. At 8, shift to North; 9, N. N. E.; at 11, N. N. W.; 1 P. M. N. W.; 5, W. N. W., at 8, West.	29.64 to 28.80 and 29.85	..	80. to 78.	Hurricane heaviest from 4 to 6 A. M. At 7 A. M. moderating before the shift at 8 A. M.
	H. M. S. Fox.....	Diamond Harbour.		A. M. E. S. E. (10), (11) and (10) at 4 A M.; 8 A. M. N. E. Noon N. N. W. (10) P. M. N. W. b. N. (9); 4 N. W. b. N. (8). At 6 (6).	29.55 to 29.37 and 29.70	..	..	Rain, squalls and thick weather throughout till midnight, when clear and cloudy.
	At Calcutta.....	..	..	6 A. M. fresh steady gale E. N. E. to N. E. with continued rain during the night. Increasing to 8 A. M. when gale (8-9) E. N. E. to E. b. N.; squalls (9-10). Noon N. b. E.; 1 P. M. North; 3 N. N. W. to N. W. much abated. 7 P. M. N. W. slight squalls.	29.72 to 61 29.64 and 29.74	29.83 to 29.76 and 29.85	78.	Scud from E. b. S. and E. S. E. 8 A. M. from East. Noon less severe; scud from N. East.

The Noacolly and Chittagong reports not being simultaneous with these, are not added to the table.

SUMMARY.

I proceed now to detail the grounds on which I have delineated the remarkable track of this very interesting Cyclone, which is distinctly an instance of the recurving of a track at the head of the Bay, and to shew its rate of travelling and other peculiarities.

The *Ararat's* Log is the first to consider, and we find her running up towards the Sand Heads on the 18th and to Noon of the 19th with a smart monsoon breeze and latterly sharp squalls, being at Noon in Lat. 13° 50′ N.; Long. A. M. 87° 11′ East; Bar. at 29.81; Ther. 84° this weather increased to midnight; the wind however still at S. b. W.

On the 20th of Oct.—The squalls are stated to come from "about West;" at 3 A. M., though the wind is marked S. b. W. and South; at 11 A. M. and at 10.30, the squalls are said to be S. W. veering to S. b. W. At Noon she was in Lat. by Acct. 16° 28′ N.; Long. 86° 58′ East; her Bar. having fallen a little, and this with the heavy appearance and a very heavy sea from the W. N. W. induced Capt. Ritchie, very properly, to heave to at 1 P. M. When hove to in Lat. 16° 35′ N. Long. 86° 58′ E. he had the wind S. S. W. and the Barometer still falling, being at 29.67 at 2 P. M. Unfortunately the continuous observations of the Barometer, though it was evidently carefully watched, are not registered. At midnight on this day it was blowing a hard gale with torrents of rain. The *Easurain* four degrees to the Eastward of the *Ararat* had nothing but a heavy swell, and the *Georgina* and *Tavoy* at the Pilot station, or $4\frac{1}{2}$ degrees to the North of the *Ararat*, had increasing breezes from the E. S. E. and the sea beginning to rise. The *Lucknow* which ship had just left her Pilot, and was some twenty miles to the South of the station, had also the sea beginning to rise with the wind at N. East.

From these data, we should at first say that, if the Cyclone was at all in action on this day, its centre would be somewhere between the position of the *Ararat* and Vizagapatam; but from her subsequent run and her Barometer on the 21st, together with the winds experienced by the other ships, there was nothing at the earth's

surface on this day beyond a strong remnant of the monsoon. I say here "at the earth's surface" because I think it quite probable that the Cyclone may have been formed and in action overhead, and not far from the *Ararat's* position, though it had not yet descended.

On the 21st Oct.—We have the *Ararat* bearing up at 5 A. M. with the wind at South, and running up to the N. N. W. with a fine breeze at Noon, when she again had it S. S. W. and by sunset it increased to hard squalls; at midnight it was a hard gale with which she was running 10 knots, being then at midnight in 18° 35′ N. and Long. 87° 23′ East with the wind about S. b. W. veering to South at 3 A. M. on the 22nd. We have also for this day the *Lucknow's* log, which ship on the 21st, at noon had a heavy gale which had veered from N. E. to W. N. W. as she ran down and hove to, showing that she was on the Western side of her Cyclone, while the *Lord Petre* in nearly the same latitude but 130 miles to the Eastward of her, was hove to with a heavy Southerly gale showing that she was on the Eastern side of it. To the Northward, the *Georgina* just leaving her pilot, found the weather becoming worse, with more suspicious appearances as she stood to the S. W., her Barometer being unsteady and the sea coming up from the S. East. The Pilot vessel *Tavoy* and the ship *Scourfield*, at the pilot station had it blowing fresh, and with the *Tavoy* hard, from E. S. E. to S. East, though the *Tavoy's* Barometer was yet 29.84 to 29.80.

From this it appears clear that there were *two* Cyclones formed on the 21st, both travelling up on tracks between North and N. N W. the Western one of which passed over the Light House at False Point; at 8 A. M. on the 22nd, being at Noon on the 21st between the *Ararat* and the shore; its centre lying then in about Lat. 17° 30′ N. and nearly on the meridian of the Light House at 176 miles distant from it, and this Cyclone we may, to distinguish it, call the Light House Cyclone. The other, or Eastern one, I consider to have its centre between the tracks of the *Lucknow* and the *Lord Petre* or between the meridians of 88° and 90°, its centre being at Noon, also on the 21st, in about 19° 12′ North and, say, 118 miles S. S. E. of the Floating Light Vessel station. The heavy Southerly gales of the *Ararat* may, it is true, have been, for a time at least, the remainder of the monsoon, but there seems no reason to doubt that, if not

from the first forming the Eastern quadrants of a Cyclone, they finally were so, beyond question. There is nothing extraordinary in this instance of Cyclones occurring about the same time, and traveling up on parallel tracks,* as those who have paid attention to the progress of Cyclonology well know.

On the 22nd of Oct.—Following, first, the Light House Cyclone: We find the *Ararat's* Southerly gale still continuing and increasing so much that at daylight, she very properly hove to again. She notes at this time, and this is of much interest "a dense black bank to the Westward" and this, I consider to have been indubitably the body of this Cyclone. At noon she was in Lat. 19° 16′ N.; Long. 88° 2 East or 88 miles S. East of False Point Light House, where the centre, preceded by the storm wave at 2h. 30′ A. M. wind then E. N. E. had already passed from 7h. 30′ to 9h. 30′ or say 8 A. M. and the gale from E. N. E. had shifted and veered to S. W. At Noon we find the *Ararat* had the wind at South, according to her log, in which it is only entered at 3 A. M. but as she was, while lying to, coming up to S. E. it is clear the wind was at least S. W. b. S. at times with her. She had hove to at 8 A. M. and if we take her drift to have been three miles per hour to the Northward, this will place her at 8 A. M. in about Lat. 19° 06′ N. and the Long. as before 88° 02′ East, with the Light House bearing N. 43° West.

And we must take this position and the Light House report, on which the fullest dependence can be placed, to fix the centre of this Cyclone there for this day, and a circle with its centre at the Light House as at 8 A. M. instead of at Noon, and the Cyclone circles extending to the position of the *Lord Petre* and *Lucknow* nearly agrees with their winds, allowing for some little incurving, so that at this time the two Cyclones of the 21st had united? from which we may deduce that the Eastern one was travelling over to the Westward, and that it was probably at their junction that the American ship *Portsmouth* was dismasted. The log of this ship will be found in the summary.

We farther find that from 8 A. M. to Noon this day, the Cyclone at the Light House had recommenced blowing "a complete hurri-

* See for a remarkable instance of them in this very locality and also in the month of October, the Ninth Memoir, Journ. As. Soc. Vol. XII. p. 771.

cane" at South, and that at Noon it was S. W. and began to break at 3 P. M. with the wind at West.

Now if we trace this track, i. e. wind East at 3 A. M. and S. E. at 5, calm at 7.30 to 9.30 or say the centre passing at 8 A. M., then renewing at South at 10 and becoming S. W. at Noon as just described we shall find that with proper allowances for its probable distance as shewn by the Barometer, this gives a track curving to the N. N. East, the actual centre of the calm space being inland, a few miles West of the Light House at 10 A. M. I need not say that the fullest confidence is to be accorded to Mr. Barckley's careful observations.

At Noon we have the gale commencing only at E. N. E. with the H. C. Schooner *Orissa* in Balasore Roads, where we have also fortunately in Mr. Bond, the Master Attendant, another excellent observer. It passed up to the Eastward of that station, veering gradually to the N. E. and becoming "a gale;" at 4 P. M. We should have expected it to have begun earlier here, and I can only account for this anomaly by the fact that the Northern and North Western quadrants of the Cyclone, when the centre reached False Point, extended to the range of high hills (from 2000 to 2500 feet high) called the Balasore Nilgherries, which form one of the Eastern extremities of the great Vindhiya chain. These lie inland about 25 miles from that station, and may have occasioned the Cyclone to lift up in that quarter for a time, and indeed to have turned off to the North East, as we see it has done. At the Pilot station it was now a heavy gale at South, and these winds will place the centre in Balasore Roads in about Lat. 21° 05′; Long. 87° 40′ East. We have, it is true, also the logs of the *Georgina* and *Cavery*, but as these vessels were drifting with the hurricane and their positions uncertain, and both in distress; the *Georgina* indeed at some distance to the S. East in 35 fathoms water, I have not used them.*

October 23rd.—The next positions we have for the centre are from the log of the P. and O. Steam Vessel *Precursor* and the H. C. Buoy Vessel *Grappler* at Kedgeree; where it fell calm at 4h. 30′

* The *Cavery* was found after the gale to be at an anchor in 9 fs. off the Reef of Point Palmiras, but even the time on board of this vessel was not well ascertained in her distressed condition, as I afterwards learned.

A. M. with the first vessel, which was then on shore close to Cowcolly light, and at 6 A. M. moderated and veered to the Northward with the *Grappler*, which vessel appears to have been at some little distance from the *Precursor*, but not far enough to account for this discrepancy, which we must therefore attribute to those errors in the estimates of the time usually made when the log is written up from recollection as it always is in these cases I suppose ? unless on board of Men-of-war, or where there is a scientific officer on board who is carefully observing while others are carrying on the ship's duties as in the case of the *Megna* Surveying Vessel with Mr. B. Pilot Bedford, the River Surveyor, whose log and register at Mud Point we shall presently quote.

To come back to Kedgeree then:

		And gale recommenced at
The *Precursor* log says, it fell calm at,.....	4h. 30′	5h. 0′
The log of the Pilot on board the *Precursor* says, it fell calm at, ...	5h. 00′	5h. 30′
Grappler's log says, moderating at 6h., and *veering* about the same time or say 6h. 10,.....	6h. 00′	6h. 10′
	15h. 30′	16h. 40
The mean of these for the station of Kedgeree will be,.....	5h. 10′	5h. 33

Or that the centre passed there about 5.20 A. M. of the 23rd Oct.

We then find the next certain position near to the centre to be that of the H. C. S. *Megna* off Mud Point at 7 A. M. when "it moderated for a short time and shifted to North" having previously blown at E. S. E.; but it seems by Mr. Bedford's table to have veered shortly after to N. N. E. and thus to have been for three or four hours before the shift at E. S. E., and for two hours after it at N. N. E. which we must take therefore, to indicate pretty nearly the track of the main body of the Cyclone. This would give us a track to the N. East for that of the Cyclone from Kedgeree. And as we shall subsequently shew the calm space itself was hereabouts of very small extent, so that we may take this to be not far from the truth.

From this station, the track to the N. East carries us into the wilds of the Sunderbunds, whence no reports can be obtained, and we cannot consider the Noacolly and Chittagong Cycloue to be any part of this at Kedgeree, as its track, was evidently from South to North, and it commenced within 12 hours of the passage of the centre at Mud Point. The veering of the wind with H. M. S. *Fox* at Diamond Harbour, I need not remark, is exactly that of a Cyclone passing up on a N. E. track to the South-East and East of the Vessel, her Barometer being lowest (29.375) with the wind North, shewing that the centre was nearest to her wheu bearing East.

Rate of Travelling.—We have, from the foregoing documents, a tolerably exact knowledge of the time which the Cyclone centre took to travel from a position a few miles West (inland) from the Light House ou False Point; on perhaps a somewhat curving track up to Kedgeree, which was from 8 A. M. ou the 22nd to 5h. 20′ A. M. on the 23rd, or 21h. 20′ of time. Now the distance on a straight liue betweeu these points is 115 miles* which gives a rate of 5.4 (five miles, four-teuths) per hour for that of the Cyclone's travelling on this part of its course; and we find moreover that passing Kedgeree at 5h. 20′ A. M. it moderated for a short interval at 7 A. M. with Mr. Bedford at Mud Point, and at 8, there was a sudden shift when it blew as hard as ever; so that taking the centre to have passed thus at 7h. 30′ A. M. this gives about an interval of two hours for it to traverse from Kedgeree Light House to Mud Point, a distance of 11 miles or 5.5 miles per hour, the former rate being 5.4.

We have thus very fairly the rate of travelling for the 22nd,—23rd, and if we were to assume that on the 21st, 22nd, it was travelling at the same rate, we should only have to measure back 132 miles to find the place of the ceutre of the *Ararat's* Cyclone for the 21st; but this distance so measured would only place the centre far enough to the South, to give the *Ararat* a S. W. wind, whereas we see by her log she had it still at about South or at most S. b. W. so that our former estimation of the place of the centre as being at about 175 miles South of False Point is probably the correct one. This distance would give

* 113 miles from Light House to Light House, but 2 miles more are allowed for the centre being to the Westward of Kedgeree.

it a rate of travelling of 7.3 per hour on the 21st and 22nd, so that its progress was, as usual, somewhat retarded by the land.

The Diameter of the Calm Centre.—This is always an element of much interest where we can obtain any approximation to it. And in this Cyclone we have a very good one, for we have seen above that the rate of travelling between False Point and Kedgeree Light Houses was 5.4 per hour, and we learn from Mr. Barckley's capital report that it fell "stark calm" at 7h. 30′, and that it was blowing a complete hurricane at 9h. 30′ A. M. of the 22nd; and as the actual centre passed somewhat to the Westward of the Light House p. 543 we may take 2 hours at 5.4, or ten miles eight-tenths, or say in round numbers eleven miles as the diameter of the centre there on that day; but on the 23rd at Kedgeree, it seems to have much diminished as the calm interval there was not more than half an hour, which would give but $2\frac{3}{4}$ miles for the diameter of the centre; and with the *Megna* off Mud Point, at the N. West extremity of Saugor Island, though the centre must have passed very close to the S. East of her (shift from E. S. E. to N. N. E.) it moderated only for a very short interval. With the *Hope*, Light Vessel off the S. W. part of Saugor Island, no calm occurred. The American ship *Sturgis* in Saugor Roads while the centre was passing her, had the wind veering from E. N. E. to South and a slight lull "for a few moments," is afterwards noticed at 6 A. M. but this was no part of the centre, and it is evident that on this day, there was no extensive calm space at the centre.

The Portsmouth's Log and Protest.

I obtained through the attention of Chas. Huffnagle, Esq. American Consul at Calcutta, a copy of the Protest and an extract from the Log of the American Ship *Portsmouth* of New York; but there are unfortunately so many discrepancies between them, and again between these and the newspaper report, that as regards the ship's exact position, and even the dates, I am wholly unable to reconcile them without the most arbitrary and unwarrantable changes, and unfortunately again, I could not obtain a sight or copy of the ship's detailed log, nor a comparison for her Barometer, so that for tracking the Cyclone, they are quite useless.

But there are some details of great interest in these papers which appear to me to indicate that this ship may possibly have been caught at the junction of the two Cyclones! or at least to have experienced one or more tornados (and this is the word too used in the log and protest) at or near to the centre of the Cyclone into which she ran. In the following brief summary which is compiled from both the log and the protest, the expressions between commas are those of the documents themselves.

The *Portsmouth* appears to have run up with strong gales from the S. W. and S. S. W. which veered to S. East when she hove to, and soon had it "blowing a perfect hurricane" which blew away her close-reefed main topsail, and sails from the gaskets, and reduced her to bare poles, wind still at S. East, ballast shifting from the ship lying on her beam ends.

"At 3 P. M. it fell nearly calm with a light breeze from south; Barometer suddenly fell from 29.40 to 28.30! Deck covered with snipes, butterflies, locusts and grasshoppers, water discoloured, ship drifting towards the land; 5 P. M. tornado struck the ship from the southward; bent the cables; 7, ship on her beam ends with her ballast shifted, and expected she would go over, cut away main and mizen masts and lost foretopmast. At 10, moderate wind at S. S. W. but Barometer still at 28.30; midnight a third tornado struck the ship from S. S. W. more severe than before. The wind now *burst up** both main and after hatches, and the dead-lights from the cabin, windows," says the Protest. The log extract says, "Hatches bursting off in spite of bars and spikes, Round-house blown all to pieces and dead-lights from the stern windows." Protest again says, "The carved work was blown from the stern, the Round-house on deck blown to pieces, and no man could stand on deck without holding on." 2 A. M. Barometer rising; 6 A. M. gale abated.

From this detail, there appears clearly to have been separate centres, or local tornados, formed at the edges or by the interference of the two Cyclones? for the first calm and extraordinary fall of the Barometers occurs at 3 P. M.; then at an interval of two hours, or 5 P. M. a tornado (used here to express the violent burst of a furious gale)

* So in the originals, but I had no opportunity, I regret to say, of making inquiries as the ship had left Calcutta, when the documents reached me.

"strikes" the ship; then it moderates at 10 P. M. but the Barometer is still depressed, and at midnight a third tornado "strikes" the ship!

Now, if these singular (we may almost say wonderful) phenomena occurred all within a brief period, say of an hour or even two, we might account for them by supposing the centre for a time stationary, and that the ship was drifted back into the calm vortex a second time, or carried on into it in some way, or that it had in some way vibrated or revolved, as Mr. Redfield supposes the centre may do to a certain extent, so as to reach the helpless ship again. But an interval of *nine hours*, that is, from 3 P. M. to midnight seems to put this out of the question; for the Cyclone, if single, must have curved forward some distance; though it may possibly have been carrying the ship with it, as in the case of the *Briton* and *Runnimede* which were whirled round and round and carried forwards for hours before they were thrown on shore (see Journ. Vol. XIV. p. 357 Twelfth Memoir) but then in that case the wind would have veered or shifted somewhat, which it did not do with the *Portsmouth*. The *Briton* had, like the *Portsmouth*, two lulls and three onsets of the hurricane, but then the wind was veering all round the compass, and the *Runnimede* close to her had but one lull; and the fact of the *Portsmouth's* Barometer having remained stationary seems conclusive, not only as to there having been double Cyclones following each other, but moreover that, as we have nearly demonstrated in the case of the *Eliza* (9th Memoir as before quoted p. 542) this continued depression of the Barometer is what really occurs in such cases, and on this account alone the record of the fact, whenever and wheresoever it happened, is most important.

The "bursting up" of the hatches is so loosely described, that we are at some loss how to consider it. It might be a bursting up of the hatches by the force of the wind getting below, which though difficult to conceive in a ship in such weather, would be analogous to what takes place in the great West India Hurricanes, where, when a door or window is burst open the other windows are *blown out*, and even the roofs blown off if another window on the opposite side is not opened to allow the exit of the air forced in by the hurricane. Or it might be the hatches getting loose by the working of the deck combing, and so falling in; though this would not be "bursting up" or it

might be *partly* the force of the wind below, (though as I have before remarked, this is very incredible and improbable,) and *partly* some uplifting power in the peculiar electric state of the atmosphere at the time, analogous to the attractions and repulsions of light bodies between oppositely electrified conductors.*

The set to the Westward over the Sand Heads.—This most dangerous set, it will be seen, was fully experienced in this Cyclone, and it is so fraught with danger to the mariner that his attention cannot be too closely directed to it. It becomes in fact at the approach of a Cyclone, a complete Gulf Stream! a term which every Atlantic sailor perfectly understands. It is also, and this often as early as the Barometer, and before the appearances of the sky and clouds are at all remarkable, an almost infallible sign of the approach or distant passage of a Cyclone!

CONCLUSION.

I have had somewhere to say that almost every successive memoir brings some new fact of importance to light, to reward us as it were for our labour, in carefully collecting and following out the details. And this, the TWENTY-THIRD of the series is no exception to the rule; for it discloses to us, not only a new track of which, though suspected, we had as yet no instance, but it also offers us another proof that here as in the China sea, the law of curving, or recurving, about the latitude of the tropics at times holds good. Upon what this depends, we are at present totally ignorant, and it is probably some effect of those great laws of atmospheric agency by which Cyclones are generated. For the present our task is to collect and register, and to sum up our preliminary results, which never fail, as we see, of affording us some practical advantage, and thus we may hope that we are doubly advancing the cause of science by eliminating that which is of present utility and by aiding in the research for general laws when sufficient facts shall be collected to deduce them.

* See Horn Book of Storms, 2nd edition, pp. 268 and 270 for instances of this electrical effect in water-spouts, as also the log of the Brig *Freak*, Journ. As. So. Vol. IX. page 1014. Third Memoir; where the vessel's foremast is torn out of her, carried up aloft, and falls down again on the deck!

Some Remarks on the Origin of the Afghán people and dialect and on the connexion of the Pushto language with the Zend and Pehlavi and the Hebrew.—By Lieut. H. G. Raverty, *3rd Regt. Bombay N. I. Asst. Commissioner, Múltán.*

In all investigations into the manners and customs of mankind, which must ever be an interesting enquiry, language has a strong claim to our attention and study. It will be found, in various ways, such an unerriug guide, that we may term it the barometer of a people's civilizatiou or barbarity; whilst on the other hand the derivation and affinity of different tongues, afford an indisputable proof of the origin aud genealogy of the various families of the human race. It also adds a physical certainty to historical evidence, and at the same time, no authority can so indubitably determine the peculiar habits and pursuits of a people, as the mauner in which their thoughts and ideas are articulated and expressed; for want of copiousness, or poverty of a language, as it may be termed, generally indicates an uncivilized state—iguorance, and superstitiou.

By oral means alone can a dialect be formed or extended, but its subsequent cultivation must depend on writiug and literature; and knowledge, on which civilization, and refinement—in fact, on which every thiug that tends to raise maukind above the level of the brute depends, must naturally be confiued within exceedingly narrow limits, until a written language has diffused it throughout all classes of mankind.

Before venturing to offer an opinion as to the origin of the Pushto language, it will be necessary to make a few observations respectiug the topography, as it may be termed, of the ancient languages of Asia, more particularly those from which we may naturally suppose the Pushto or Afghánian language to have sprung; still all researches into high antiquity are more or less involved iu darkness and perplexity, aud every argumentative enquiry, however ingenious, must at last rest ou the uucertain basis of conjecture and fancy.

According to the accounts of Herodotus and other ancient writers, we find, as is the case even at the present day, that in cer-

tain countries of no great extent, a variety of languages, totally distinct from each other, was used; whilst on the other hand again, the same language, with slight variations in its dialects, was spoken throughout regions of very great extent. The first remarks are applicable to nearly all mountainous districts, inhabited like Afghanistan by various tribes, for the most part independent of each other.

Throughout the boundless steppes of the Asiatic continent were spread the more prevalent languages. The limits of the various dialects also, were the same stupendous ranges of mountains, and the same noble and mighty rivers, which formed the boundaries of the different territories. Between the Attak or Indus, the Æman or Oxus, and the banks of the Dajlah or Tigris, one language appears to have predominated, a second between the Tigris to the Halys or Kizil Irmak, and a third betwixt the latter river to the Ægean sea.

To commence with the language which appears to have been most widely prevalent in ancient times, we find that from the Caucasian* range of mountains on the north, to the Red sea on the south, and from the banks of the Euphrates on the east to the Halys on the west, one mighty tongue was spoken, which, with some slight variations, retained a primitive and distinct character, known as the Semitic, and of which the Arabic, Assyrian, Chaldaic, Cappadocian, Hebrew, Sarmatian, and Phœnician were merely dialects.†

From the Tigris eastward, as far possibly as the mountain range which forms the western barrier of the Indus, and from the Oxus to the Indian sea, another great language prevailed—the various dialects of which, both in elements and construction, as also in vocabulary and phraseology, were so totally distinct, as to preclude the possibility of their being of the same family as the Semitic. One peculiar feature of the ancient dialects of Persia is, that every vowel, whether short or long, has a distinct character. We are indebted to the labours of several eminent scholars in Zend literature for many important facts on this subject, particularly in the Zend Avesta

* That is to say, what is at present known as the Caucasian range, not the Koh-i-Káf of the ancient Arabian authors.

† Heeren.

the sacred volume of the Parsís or Guebres, two English translations of which are about to be given to the world—one by a European Orientalist, the other by an Asiatic, and a disciple of Sapetman Zoroaster. From these researches we find, that three different languages were spoken in Irán*—the Zend, in which the sacred books of their religion were written; the Pehlavi; and the ancient Persian, or Párs. The date from which the Zend ceased to be the medium of conversation is unknown, but as early as the reign of Bahmán, the Pehlavi was considered rude, and on this account held in distaste at the court of that ruler;† and in the reign of Bahrám Gúr,‡ in the 5th century of our era, was proscribed by edict, and soon after fell into total disuse. After this event the Fársí became the idiom of Persia. It was divided into two dialects—the Derí, or court language, and the Párs, which was spoken by the people at large. The Shah Námeh of Ferdousí is almost entirely written in the former tongue.

If we compare these dialects with the modern Persian, divested of the Arabic and Turkish, which, during a period of several centuries, has crept into it, we shall find them differing essentially in several respects; but at the same time, in phraseology and construction, bearing such a striking similarity, as to prove almost indubitably, that the dialects themselves, as also the people who spoke them, must have sprung from one and the same original stock.

It is a striking fact that no convulsions of government, no efforts of literature, can so alter a language as to destroy every atom of similarity between the speech of the present day, and that of most ancient and remote origin. Nothing but the total extirpation of the aborigines of a country appears capable of accomplishing so singular and wonderful a change. For a striking instance of this

* The eastern name for Persia.

† According to the Ferang Jehángírí, Bahmán also called Ardíshír, was son of Isfandiar, son of Kashtásib, son of Lohrásib. Some say he was so called for his uprightness and justice, others, that it was from his precociousness as a child; and others, that it was on account of the length of his arms which were so long that his hands reached his knees. There are no less than thirteen meanings given to this word in the work I have quoted: he died A. D. 240.

‡ He ascended the throne A. D. 420, and reigned twenty years.

we have merely to look to the present dialects of the peninsula of India, or, for a still more conclusive proof, to the modern European languages, amidst the polish and refinement of Latin and Greek.

It appears, therefore, that the principal languages of the Asiatic continent, that is to say, what was considered Asia by the ancients, were the Semitic, and the Irániân or Persian,* which latter was spoken as far as the western bank of the Indus, beyond which the Sanskrit and Prakrit commenced.†

In ancient times as in the present day, the greatest diversity of language appears to have prevailed in mountain tracts, generally inhabited by a number of independent tribes, who may either have been aborigines of those mountains, or strangers compelled to seek in them refuge from more powerful neighbours, or greater security from invasion and subjection to a sovereign's yoke. In the absence of facilities for communication with foreigners, their languages have been less liable to be mixed up with other tongues, and from the more numerous tribes again separating into smaller tribes, a variety of dialects was naturally formed, which in many points differed from each other.

The ancient languages of Persia, suggest other important facts not to be passed over without notice, and which also bring us to the point to which these straggling and imperfect remarks are intended to lead—that not merely in the modern Persian territory do we find languages which still exist, mixed up with others, and only preserved from oblivion by a few written remains; but that in the present day there is also a language spoken immediately west of the Indus, which is totally different in phraseology and construction from any

* Heeren.

† "With regard to the affinity of the language from Bactria to the Persian Gulf, it would of course follow, that the country being that of the ancient Persians, the Persian language would be spoken in it, varied as to dialect, but radically the same. If the language of Persia was Zend, this would have been in use throughout Ariana; and its strong affinity to Sanskrit would justify the extension of Strabo's remarks even to the Indians of the Paropamisus and the west bank of the Indus. With all the other divisions of Ariana there is no difficulty, even if the Persian of ancient did not materially differ from that of modern times; for Persian is still the language of the inhabitants of the towns of Afghanistan and Turkistan—Kabul and Bokhara." Ariana Antiqua, pp. 122, 123.

modern tongue, and in all probability derived from the Zend, Pehlavi and the Hebrew. The language to which I refer is the Pukhto, Pushto, or Afgháníán.

Languages can alone be fashioned and extended by oral use, though by writing and literature, their subsequent cultivation can be effected, and it is therefore certain that the dead languages of the Asiatic continent must at one time have been generally spoken,* from the fact, that several living languages are evidently derived from them.† The cause of their ceasing to be the medium of communication may have arisen in various ways—the intercourse with foreigners brought thither by commercial pursuits, subjugation to the yoke of others, and such like circumstances, so affect a language as to produce various new dialects, which, as proved by our own mother-tongue, are capable of undergoing still further transformation.

There has perhaps never been a greater diversity of opinion, respecting the descent of any one people, than that of the Afgháns. Ferishtah‡ traces their origin to the Copts, whilst most oriental writers are of opinion that they are of Jewish family. According to Klaproth, Gatterer considers the Afgháns to be a Georgian race, and their language Georgian also. The Armenians hold the Afgháns to be descended from themselves; and Krusinsky, Reineggs, and several other European historians, notwithstanding the want of proof to support such an opinion, appear convinced of it. Major Keppel§ (now Earl of Albemarle) states that the people of Shirwán, and the adjoining countries, consider the Afgháns are descended from them. St. Martin‖ in his account of the Armenian Arghowans, is of opinion, that the Afgháns cannot be identified with them. Other authors have declared them to be descendants of the Indú-Scythians, the Medians, the Soghdians, Turks, Tartars, and Monghols.¶

* I have lately heard of a seal having been found near Pind Dadun Khan, in the Panjáb, bearing an inscription in the arrow-headed character.

† Heeren.

‡ Táríkh-i-Ferishta.

§ Personal Narrative of travels, vol. II page 194.

‖ Memoires sur Armenie, Vol. I. page 213 to 226.

¶ See Tárikh-ul-Yamini of Atbi, Matlaa-us-Salátin, and Jami-ul-Tawárikh.

The Afgháns themselves persist in their descent from the Jews, and their traditions on the subject trace their ancestry to Saul, king of Israel.*

The best account I have met with on the subject, has lately fallen into my hands quite unexpectedly. It is contained in a history of the house of Saddo or Saddozoé tribe of the Afgháns. The work itself is written in 8vo. 640 pages of 17 lines to a page, and entitled, Tazkirát-ul-mulúk. It is very rare, and I imagine there is not a copy to be found east of the Indus, even if it has ever been heard of before by Europeans. Two-thirds of the entire work are occupied in the detail of events which have happened since the death of Ahmed Sháh, Abdálí. The commencement alone is sufficient for my present purpose; on some future occasion I may give a translation of that part which terminates with the death of the founder of the Dúráni monarchy. I may also add, that the work is written in Pushto. The account is as follows.

"The chief object of the author in writing this august work, was the compilation of a history of the ancestors of the tribe of Saddo, known as the Saddozoés, who, after the family of the last of the Prophets, (on whom be the blessing of the Almighty) are the greatest and best, as well as the most generous and open-hearted of the children of Adam.

"All traditions and histories agree, as to their exalted descent from the Ban-i-Israel, of whom their great ancestor is Malik Tálút (Saul) of the tribe of Israel, who afterwards became the ruler of that people. From Malik Tálút is descended Afgháu, one of the greatest of God's creatures, and who in the reign of Súlimán, was, by that monarch, made sovereign of the Jíns and Diws.

"From Malik Afghán, Abd-ur-Rashíd bin Kais al-laik, who was a contemporary of the prophet of God, and one of his most honoured associates, is a lineal descendant. He is the ancestor of the Sarbands, who are considered the first of the Afghán tribes, as also of the twelve *astanas* or families who were formerly considered as hereditary devotees.†

* See Sir G. Rose's Afgháns, the Ten Tribes and the Kings of the East, &c. lately published.

† Both Mr. Elphinstone, (Kabul Vol. 1st page 253) and Professor Dorn,

"His Highness Saddo chief of the Afgháns, being the fruit of the tree of that garden, and a blossom of that rose tree, this account of his ancestry has been compiled to the end, that their fame may be known to posterity.

"What can we inherit, but fame beyond the limits of the tomb."

"The following histories and authorities have been consulted in the composition of the work, viz.;—Táríkh-i Salatín-i-Súreah; Tabakát-i-Akbirí; Aæn-i-Akbirí; Mirát-ul-Afghánah, which work was written by Khán Jehán, Ludhi, in the reign of the Emperor Jehángír; Táríkh-i-Sháhán-i-Safawiah, Iráni; Sháh Jehán Námeh; Tárikh Alamgírí; Furukh Seorí; Táríkh-i-Mahommed Sháhí; Nádír Námeh; Táríkh Ahmed Sháhí; Rassalah Akbar, Khadkah; and other information has been collected from the narratives of trustworthy persons. I have entitled the work, Tazkirát-ul-Mulúk, of the ancestry of the tribe of Saddo, the chief of the Afgháns. It consists of one *mukaddamah* (preface), two *asals* (originals), and one *khátímah* (epilogue).*"

Mukaddamah.

On the forefather of Saddo, Chief of the Afghán people.

The great ancestor of this tribe is Malik Tálút (Saul) who is mentioned in the Korán and other works, as descended from Binyamín,

(Neamut Ullah, Part II. page 40) have fallen into error respecting this *fourth* grand division of the Afgháns, called by them respectively the Betnee, and Botni, Baṭni, or Báṭiní. باطني is not the name of a tribe, but is derived from the Arabic باطن batin which means, *hidden, or knowing the hidden or concealed, hence the Almighty is often termed.* الباطن *Al Bátin.*

* The contents of the whole work are;—*Mukaddamah.* On the forefathers of Saddo, chief of the Afgháns. First *Asal.* On the subject of those of the tribe who have ever dwelt in Afghánistan. This *Asal* is divided into two *Faraæ* or Parts. 1st. Respecting that branch who have ruled over the whole tribe. 2nd. On the other members of the tribe, who still dwell in their native country. Second *Asal.* On that branch of the clan who left their country and took up their abode at Múltán. This is in five *Faraæ* or parts. 1st. On the Khan Modud Khail. 2nd. The history of the Bahádúr Khail. 3rd. Account of the Kámrán Khail. 4th. Account of the Zœfarán Khail. 5th. The Khwájah Khizar Khail, who are generally known as the Súltán Khail, Khodkah. *Khátímáh.* Account of the remaining branches of the Khwájah Khizar Khail, the descendants of Shah Dur-i-Durán, and their dispersion into various parts of India, and the Panjáb.

bin Yákúb, bin Issák, bin Ibráhím (may the blessing of the Almighty rest on them and on their house). Tálút was celebrated amongst his countrymen for his wisdom, knowledge, and mightiness in war; and the All-wise Creator of the Universe, made him king over Israel, and commanded him to bring to perdition the infidel Jálút, the enemy of his people.*

At this time Mehtar Dáoud, who dwelt in the district situated between the territories of the rival princes, went and joined the army of his countrymen,† who were hard pressed by the superior army of Jálút ‡ The king on this account issued a proclamation to the effect, that whoever would go forth to fight with Jálút

* And their prophet answered and said unto them, verily God hath set Tálút king over you, and hath enlightened his mind, and strengthened his arm: they answered, How shall he reign over us, seeing that we are more worthy of the kingdom than he, neither is he possessed of great riches? Samuel said, Verily God hath chosen him before you, and hath caused him to increase in knowledge and stature." Al Korán. Chap. II.

"Now there was a man of Benjamin, whose name *was* Kish, the son of Abiel the son of Zeror, the son of Beehorath the son of Aphiah, a Benjamite, a mighty man of power.

And he had a son, whose name was Saul, a choice young man, and a goodly: and *there was* not amongst the children of Israel a goodlier person than he: from the shoulders and upwards *he was* higher than any of the people. 1st Samuel, Chap. ix. verses 1, 2.

So Saul took the kingdom over. Israel, and fought against all his enemies on every side, against Moab, and against the children of Ammon, and against Edom and against the kings of Zobah, and against the Philistines: and whithersoever he turned himself, he vexed them.

And he gathered an host and smote the Amalekites, and delivered Israel out of the hands of them that spoiled them. 1st Samuel, Chap. xiv. verses 47, 48.

† Wherefore Saul sent messengers unto Jesse, and said, Send me David thy son, which *is* with the sheep.

And Jesse took an ass laden with bread, and a bottle of wine, and a kid, and sent them by David his son unto Saul. 1st Samuel, Chap. xvi. verses 19 and 20.

‡ Now Saul, and they and all the men of Israel, were in the valley of Elah fighting with the Philistines.

And David rose up early in the morning, and left the sheep with a keeper, and took, and went, as Jesse had commanded him; and he came to the trench, as the host was going forth to the fight, and shouted for the battle." 1st Samuel, Chap. xvii. verses 19, 20.

(Goliath) and kill him, should receive the hand of the king's daughter in marriage, and be declared heir to the throne.

When Tálút went out to meet Jálút his troops, being seized with a sudden panic, fled from the field with the exception of 313 persons, who, by the will of God, took courage and remained with their king.* It was at this time that Dáoud killed the infidel Jálút in single fight, after which the small but brave band which had stood its ground, fought with such determined courage that the enemy were entirely defeated and put to the rout.†

After this action on the part of Mehtar Dáoud, it became incumbent on king Tálút to fulfil the terms of the covenant which he had made, and accordingly he gave his daughter to Dáoud in marriage, and a patent of succession to the throne.

During the life-time of king Tálút, Dáoud served him faithfully, and at his death succeeded him. Armíah (Jeremiah) and Birkíya, Tálút's sons, were raised to the highest honors, became the captains of his armies, and continued in his service during their life-time.

In the common course of events, Dáoud himself set out on that journey from which no traveller returneth, and was succeeded by his son Súlimán. He appointed Afghána the son of Armíah, to the

* "And Tálút said unto his soldiers, verily God will prove you by the river, for he that drinketh thereof shall not be on my side (but he shall be on my side who shall not taste thereof) except he who drinketh a draught of the water out of his hand. And they drank thereof, except a few of them. And when they had passed over the river, he and those who believed with him, said, We have no strength this day against Jálút and his host. But they who considered that they should meet God at the resurrection, said, How often hath a small army by the will of God, defeated a greater one, and discomfited it, for God is with those who patiently persevere. And when they went forth to battle against Jálút and his forces, they said, Oh Lord, pour on us patience, confirm our feet, and help us against this unbelieving people. Therefore they discomfited them by the Almighty will, and Dáoud slew Jálút." Al Korán. Chap. II.

† "And the men of Israel and of Judah arose, and shouted, and pursued the Philistines, until they came to the valley, and to the gates of Ekron. And the wounded of the Philistines fell down by the way to Shaaraim, even unto Gath, and unto Ekron.

And the children of Israel returned from chasing after the Philistines, and they spoiled their tents." 1st Samuel, Chap. xvii. verses 52, 53.

command of his armies, and the government of the Jins and Diws ;* whilst Asif, the son of Tálút's son Birkíya, was made his principal minister.

One day king Súlímán seated on his throne and accompanied by his minister was journeying through the air,† when they passed the district of Rúdah, in which is situated the lofty mountain of Káseghar, which lies between Pesháwer and Kandáhár, and Kábul and Múltán. It is near the town of Darában and west of the Sindhu (Indus) river.

Pleased with the spot, and the salubrity of the climate, the wisest of men directed his minister to form a seat out of a stone which was at hand. This being almost immediately done, Súlímán sat in it for some time and enjoyed the beauty of the landscape which lay spread out at his feet. The mountain is known at present as the Takht or (Throne) of Súlímán.‡ A portion of the throne still remains, to which the people of the surrounding districts, are in the habit of making pilgrimages.

* "This statement will not appear so fabulous if we compare it, with Samuel 2d. Chap. xxi. verses 15 to 22, for Diw, and Jin, mean— a giant as well as a demon or genii—دیو díw. A devil, a demon, genius, giant, spirit, ghost, hobgoblin. The Díws or Dives, Jíns, Genii, or giants of eastern mythology, are a race of malignant beings. See جن also in Richardson.

† "No name is more famous among Muhammedans than that of Solomon. According to their belief, he succeeded David his father when only 12 years old ; at which age the Almighty placed under his command, all mankind, the beasts of the earth and the fowls of the air, the elements, and the genii. His throne was magnificent beyond description. The birds were his constant attendants, screening him like a canopy from the inclemencies of the weather, whilst the winds bore him whithersoever he wished to go. Every age and every nation have had their fooleries, and even many of the received opinions of modern times will not bear the touchstone of Truth. The sorcery laws of our country are a far more authentic disgrace to human nature, than all the wild, yet pleasing fables of the East." See Richardson.

‡ "In the southern part of the Wuzeeree country, where this range is passed through by the river Gomul, it is low in both senses, and forms the lofty mountain of *Cussay Ghur*, of which the Tukht of Súlímán, or Solomon's Throne is the highest peak." Account of the kingdom of Cabul. vol. 1st page 164.

"I was told that on the top there was a holy stone or rock, the seat of a Musalman Fakir, whose name it bears; but I venture to doubt the story." Vigne's Ghuzni, Cabul, &c. Page 61.

The mountain tract of Káseghar, and the district of Rúdah, were assigned in feudal tenure to Afghána.

The original meaning of the word Afghana is *fighán*—a Persian word, which means "*complaint*," "*lamentation*," because he was a cause of lamentation to the devil, jíns, and mankind. From the constant use of the word, the vowel point (ـِـ) *kasrah* was dropped, after which the other letters could not be sounded without the aid of a vowel, and *alif-i-wasl* was placed before the *gh*, and thus made Afghána.

Malik Afghán having taken possession of his new territory, (to use the expressive words of the author) "irrigated the land of that mountainous country with the water of the sword, and planted in the hearts of its inhabitants, the seeds of his own faith. He fixed his residence at a place named *Púsh* or *Pásh*, situated in the mountains, and from the name of this place, the people have derived the name of Pushtún, and their language Pushto. Some traditions state that the Afgháns acquired their language from the Diws, and others, that it is the original dialect of the aboriginal inhabitants of Káseghar, and that the Afgháns were in the habit of carrying off the wives and daughters of those Infidels, and intermarrying with them,* thereby learning from them the Pushto language, and in course of time forgetting their own Ibrahámí tongue.†"

Again to use the words of the author, "Malik Afghán having purified the face of the mistress of that country from the filth of the wicked infidels by the pure water of the sword, and having given unto her the rouge of beneficence, and decked her out in the bridal garments of religion and the ornaments of Islam, bestowed her in the marriage of possession to one of his sons," after which he returned to the court of king Súlímán, at Bait-ul-Mukaddas,‡ where at length he died at a very advanced age. His descendants from generation to generation, and from tribe to tribe, continued to dwell round about the mountain of Káseghar and to rule over it, and were at constant war with the Infidels, as the neighbouring people were termed.

* See the Kullasat-ul-Ansáb.

† Ibrahámi means the Hebrew language.

‡ بَيْتُ الْمُقَدَّسُ The Sanctified or Holy Temple—the Arabic name for Jerusalem.

At length, during the chieftainship of Abd-ur-Rashíd bin Kais al Laik, an event happened which was the cause of shaking the world to its very foundations*—the joyful tidings of the last and greatest of the Prophets, resounded both in Arab and in Ajam, and Abd-ur-Rashid became desirous of making a pilgrimage to Mekka for the purpose of seeing him :—

" Love ariseth not alone from seeing the object ;"

" This wealth is often acquired by mere conversation."

In company with several of his kinsmen and friends, he set out for the Hedjáz, and having arrived at Mekka, performed his pilgrimage according to the rites and tenets of the religion of his forefathers, Israel, Issák, and Ibráhím.† He now set out for Medina, and on the road fell in with the celebrated Khalid-ibn-Wálid, " the sword of God,"—to whom he explained the object of his journey. They travelled towards Medina in company, and on his arrival there, Abd-ur-Rashíd became a convert to Islám. In the numerous struggles of that period, he became conspicuous for his intrepid bravery, which made the Prophet bestow on him the surname of بتان or پتان ‡ (batán or patán) which in Arabic means the *mast* of a vessel, without which it cannot sail, neither can the ship of war sail along without the mast of battle.

Abd-ur-Rashíd having acquired great renown, at length obtained his dismissal, and was allowed by the Prophet to return to his native land, but was at the same time enjoined to publish and diffuse the doctrines of Islámism amongst his countrymen. He departed from Medina, and in due course reached his home in safety, after which

* Allowance will of course be made for religious prejudice.

† "The temple of Mecca was a place of worship, and in singular veneration with the Arabs from great antiquity, and many centuries before Muhammad. Though it was most probably dedicated at first to an idolatrous use, yet the Muhammadans are generally persuaded that the Caaba is almost coeval with the world ; for they say that Adam, after his expulsion from paradise, begged of God that he might erect a building like that he had seen there, called Beit-al-Mamúr, or the frequented house, and al-Doráh, towards which he might direct his prayers and which he might compass, as the angels do the celestial one." Sale's Introduction to the Korán Page 83.

‡ This word I cannot find in either Kámus, Burhan Kátaœ, or Richardson.

he converted his family and tribe to the new faith, and taught them the Korán. He made war on the infidels with greater zeal than ever, and was celebrated for his piety. At length finding his end approaching, he called his family and tribe around him, and enjoined them to keep their hearts fixed on the only true religion, and their feet firm in the path of Islám; to show friendship and obedience to the followers of Muhammad, and to make war on the infidels, and convert them to the only true faith. After taking an affectionate leave of all, "the swallow of his soul having escaped from the wintry cage of this world, took its flight towards the summer mansions of eternal bliss."

He was blessed with three sons.—Sarí, Gharí, and Tabrí. The first known as Sarban or Sarband, succeeded his father in the chieftainship, and gave name to one of the two great divisions of the Afgháns called Sarbans. The second also called Gharghasht, gave name to the Gharghashts. The descendants of these three sons constitute the whole of the different Afghán clans, with their numerous branches and ramifications.

The tribes which are included in the Sarban division, are;—Abdálí, Tarín, Barech, Mabánah, Gharshín, Shiráni, Bábarí, Kánsí, Jamand, Kátaní, Kalíáni, Tarkáni, Khalíl, Mhomand, Dáouddzoé,* and Yúsufzo'e. The twelve *Astánahs* or families who are considered sacred by the other Afgháns, from their progenitors having been devotees, are also included amongst the Sarbans. The Abdálí, Tarín, Bábarí, Jamand and Yúsufzo'e tribes have each one family, the Khalíl three, and the Mhomands four.

The different branches of the Gharghasht division or offspring of Gharí, are;—the Surání, Jailam, Drukzo'e Afrídí, Chakáni, Jankí or Jangí, Keráni, Bábí, and Mashwáni tribes.

The third son, Tabrí, is the progeniter of the Ghalzo'e, Lúdhí, Níazí, Lohání, Sorbaní, and Klakpúr clans, the whole of whom are styled Tabríns. It is said there was an illicit connexion between one of the daughters of Tabrí, and Mast Ali Ghorí,† and after a short time

* Zo'e in Púshto means, son—záí is a corruption of the word.

† The ancestor of the Ghorían Sultans who conquered Ghazní, in 1152. غَل *ghal* in Púshto means a thief, and زوي zoé a son, hence غَلزوي Ghalzoé the son of a thief; زاي is a mere corruption of the word.

the fruits of this amour becoming apparent, the father, to make the best of a bad matter, gave her to him in marriage. Three sons were the offspring of this marriage—Ghalzo'e of whom she was pregnant before the nuptial knot was tied,—Lúdhí, and Sarwání.

The tribes above mentioned are the whole of those who are of pure Afghán descent—the offshoots of the three sons of Abd-ur-Rashíd, Pátan. He was buried at Káseghar, and succeeded by his eldest son Sárí, who was constantly at war with the Kafirs or Infidels. He had two sons—Sharkabun, and Kharshabun. The Sarbans are the descendants of the former, and the Yúsufzo'es, Mohmands, Khalíls and other tribes inhabiting the plain of Pesháwer, are the children of the latter.

On the death of Sarí, Sharkabun his son was acknowledged chief of the Afghánah. He was celebrated for his piety and wisdom. In his wars with the infidels, he not only acquired great wealth, but also increased his territory, and brought many of the neighbouring tribes under his authority. During his chieftainship Kandáhár, and Kábul were conquered by Húját bin Yúsuf, Sakafí, who was governor of Khorásán for the Khalífah Abd-ul-Malik bin Mirwáu who reigned from 692 to 698 A. D. This event greatly increased the authority of Sharkabun, and established his power more firmly than before.

He is said to have been succeeded by Abdál his son. Some accounts mention that he was the son of Sharkabun, and others that he was his grandson, but neither of these accounts can be correct, as there is a space of nearly three hundred years between them; Sharkabun being a cotemporary of Húját bin Yúsuf Sakafí, before referred to, whilst Malik Abdál lived in the reign of Máhmúd bin Sabuktagín, who succeeded his father to the throne of Ghazní, in the year of the Hijrah 387. This great hiatus between the reigns of these two chiefs may be accounted for in the following manner. It often happens, that the names of those chiefs who have been celebrated for their wisdom, bravery, piety, or numerous progeny, have been alone handed down to posterity, and those of mediocrity set aside and forgotten. There is an instance of this with regard to Hasham* and Abd-ul-Shams, who were both sons of Abd-ul-Manáf.

* The great-grandfather of Muhammad.

The descendants of the former are still styled Ban-i-Hasham, whilst those of the latter are known as the Ban-i-Omeyah, from Omeyah the celebrated son of Abd-ul-Shams, and thus the father's name has been dropped altogether. In the same manner, Malik Abdál having acquired a great name for his bravery, equity, and generosity, and surpassed many of his predecessors in grandeur and dignity, his name has been handed down to us, whilst the very remembrance of those of little or no celebrity, is now altogether lost in oblivion. This is the great cause of the confusion which often takes place in the geneological histories of different tribes and people, and hence the reason why Malík Abdál has been called the son or grandson of Sharkabun.

Malik Abdál thus became chief of the Afghánah—Sarbans, Gharghashts, and Tabríns. During his reign the people began to pay attention to agriculture, and the lands about Káseghar were brought under cultivation. Abdál, who was famed for his bravery, followed in the path of his ancestors by making war on the people of the surrounding parts, in the plundering of whose property his followers acquired great wealth. A number of the infidels who dwelt in the vicinity of the Káseghar district, was also at this time converted to the Muhammadan faith. At length the Afgháns having no infidels to plunder, and insufficient land to yield them a subsistence, began to take service under the Ghaznívíd Súltáns, from whom they obtained the district of Bagrám, now known as Pesh'áwer, as a feudal fief.* Of the countries to the north, such as Suwat,

* The account contained in the ریاض المحبت (Gardens of Friendship) by Mahábbat Khán differs in some respects from the preceding narration. He says, "up to the time of the Prophet of Islám, the descendants of Afghánah dwelt in the Salmán mountains, at which period Kais was their chief. He subsequently went to Arabia to do homage to Muhammad, taking with him eleven persons of his tribe, who with himself became converts to the new faith.

"He returned to his native land, but in the following year he again returned to Arabia with seventy of his tribe, and joined the followers of Muhammad a short time previous to his attack on Mekka, in which affair, and the subsequent operations, Kais behaved so well, that the title of Abd-ur-Rashíd was conferred on him, and he soon after returned to his home.

"After the death of Muhammad, Kais Abd-ur-Rashíd, with a number of his people followed the two succeeding Khalifs in their wars; and when the Khalif

and Bajawer, which were in the hands of the Kafirs, they got possession by force of arms. They also obtained grants of land at Ghazní and Kábul, from Súltán Máhmúd and his successors, and by degrees began to emigrate from the neighbourhood of Kaseghar, and

Osmán determined on the conquest of Khorásán, he requested Kais to obey the orders of Abd-ullah bin Æámir bin Kárez, who had been appointed to head the expedition. This chief had been directed to settle the Afghán tribe with their families, after the conquest of that province, between it and Hindústán, that they might become a barrier against invasion from the latter country. Kais assisted in the conquest of Khorásán, after which, the tract of country lying between Hirát and Kandáhár was bestowed on him and his tribe, subject to the governor of the province.

"At the period of the struggles between the Omeyahs and Abbásís, which ended in favour of the latter, the Government of Khorásán was administered by Húját bin Yúsuf, Sakafí, who sent an exepedition into Hindústán, under his nephew Kásim bin Muhammad bin Yúsuf, Sakafí, who was accompanied by a strong body of Afgháns. They advanced through the district of Roh,* and at length reached Múltán, after annexing the former district, which was made over to the Afghán tribes, with directions to keep under the refractory Hindús. From the occupation of Roh by the Afgháns, they obtained the name of Rohillas.

"Sabuktagín the founder of the Ghuzniwíd dynasty, and father of the great Muhammad, entertained a number of Afgháns in his army. When that ruler died, Ismaaíl his son by the daughter of Alta'kin, the owner of Sabuktagín, for the latter was originally a slave, succeeded his father, but Muhammad, another son by the daughter of the chief of Zábúlistán (Kábul) opposed him in the succession, and a civil war ensued between them. The Afgháns who were dependent in some measure on that chief, joined his son-in-law Muhammad, who defeated Ismaaíl, and confined him in a fortress.

"In gratitude for this effectual aid on the part of the Afghánah, Muhammad gave his sister in marriage to Sá'ho the chief of the tribe, by whom he had three sons—Salár, Mas'œud, and Ghází, who are buried at Baráj.

"When Sultán Muhammad set out on his expedition against Samnáth in Gúzerát, he took with him a body of Afgháns. Several times during the siege of that stronghold, fortune seemed to incline against the Muhammadan arms, but at length the Afgháns were brought to the front, who having fastened the skirts of their garments together, attacked the Hindús with such fury that the latter were entirely defeated, but not until the victors as well as the vanquished had sustained immense

* The Belúchís and other inhabitants of the Deráh Ghází Khan, and those of the southern part of the Deráh Ismaáíl Khán districts, speak of the mountain range immediately west of the Indus, to the southern boundary of Afghánistán, by this name.

settled in those places they considered best suited to themselves. Up to the time of Malik Abdál, the whole of the tribes considered and obeyed him as their head and chief, but now each tribe and village began to choose their own governors, and ceased to pay that respect and obedience to his authority, which they formerly did; in fact they fell headlong into the slough of arrogance and presumption.

Abdál was succeeded by his son Malik Rajar. This prince—a second Nimrod—was passionately fond of the sports of the field, in which he spent the best part of his days and nights. He was blessed with four sons—Œsau, Nur, Khokai, and Makou, the first of whom, a God-fearing and just personage, succeeded him in the chieftainship; the others gave name respectively to the Núrzo'e, Khokarí, and Makou tribes.

The remainder of the Abdálís, and other clans, which had up to the present period continued to dwell in the Káseghar district near the Takht-i-Súlímán, finding it too small to support so many families, began, in the hot season, to migrate with their flocks, to the neighbourhood of Kandáhár, returning again to their old haunts at Káseghar in the winter.

Malik Œsau had three sons, Zírak, Is'hák, and Alí. On his death he bequeathed the turban of authority to Zírak, his sword to Is'hák, and his carpet for prayer to Alí. From these two latter, the Is'hákzo'e, and Alízo'e branch of the Abdálís are descended, and from them is also descended the only one of the twelve *astánahs*, or families who are devoted to the priesthood, as already referred to.

Zírak, who was a wise and able chief, governed his tribe with energy and ability. He completely rooted out the crimes of impiety, adultery, and dishonesty, which appear to have been but too prevalent at the period in question.

The five tribes which have been already mentioned as the Abdálí clan, viz; Is'hakzo'e, Alízo'e, Núrzo'e, Khwagání, and Makou, are known as the Panjpa'o branch.

My own opinion is that Malik Abdál was a cotemporary of Súltán

loss. In reward for this important service, the 'Breaker of Idols,' bestowed on each of the Afgháns the Túrkí title of Khán: their former title of Malik was derived from Malík Tálút." Rí'áz-i-Mahábbat.

Máhmúd, Ghaznívíde, Malik Zírak of Shah Rukh Mirza, son of Amír Timúr, Gúrgání, between whose reigns there is a period of some three centuries. As has been already noticed, the names of the most celebrated chieftains can alone have been preserved by their countrymen, whilst those of less fame have sunk into oblivion.

The district of Rúdah and Káseghar, as before stated, not being of sufficient extent to support the great number of people, to which the Afgháns had by this time increased, Malik Zírak was induced to send an agent to Shah Rukh Mírzá,* at Hírát, for the purpose of soliciting a grant of the districts round Kandáhár. This request was favourably listened to by the Sháh, and Zírak in consequence gave directions to the Abdálí, Barech, Tarín, Jamad, Ghalzo'e, Kákur, Kásí, Bábur, and other tribes—who were more numerous than the extent of their lands could support—to proceed to Kandáhár and settle on the lands granted by the Sháh in that district. To each tribe a portion of land was given, in proportion to the number of families of which it consisted, and for which ground they had to pay a small tax to the Governor of the province.

Zírak had three sons—Popul, Bárak, and Alako, from whom have sprung the Populzo'es, Bárakzo'es and Alakzo'es. At his death Popul succeeded him in the chieftainship of the whole Afghánah people. Being a sagacious and intelligent chief, and endowed with the tact of government, he kept the whole of the tribes under subjection and obedience. They also were generally well satisfied with his government, but at the same time, those who showed any opposition to his authority, were punished by the Kandáhár Governors, and this tended still more to keep all under proper restraint.

Popul had also three sons—Habíb, Bádú, and Aiyúb. The two former were by one mother, and the latter by another wife. Some also say that Aiyúb was the son of the first wife by a former husband.

Bádú was the ancestor of the Bádúzo'es, and Aiyúb of the Aiyúbzo'es. At length Popul suddenly finding his end approaching, sent for his children, and after giving them much good advice, and exhorting them to follow in the footsteps of their ancestors, departed this life, leaving the chieftainship of the tribes in the hands of his eldest son Habíb.

* The accomplished son of the great Timur.

The children of Afghána who had now become a numerous people, and had, up to this time, paid obedience to the authority of their chief, began to show symptoms of restlessness, and dislike to the yoke of Habíb's supremacy. At length they commenced quarrelling amongst themselves, and the *khails* or clans of every village having declared themselves independent, set about nominating their own chiefs. All was uproar and confusion; the rich tyrannized over the poor, and the strong plundered the property of the weak; might was right, and villainy, impiety, and depravity reigned supreme.

Malik Habíb endeavoured for a long time to stem this torrent of rebellion, and regain his lost authority over his people, but without success; and at length not one tribe remained on his side. The Taríns, Barechis, Ghalzo'es, Kákurs, Shíranís, and others, each set up one of their own tribe as pretenders to the chieftainship, raised the standard of revolt, and commenced a civil war. The life of Habíb was spent in civil contentions, which were entirely without avail. He had three sons—Bámí, Ismáaíl, and Hasan, from the two last of whom are descended the clans of Ismáaílzo'e, and Hasanzo'e.

Bámí, who was of a mild disposition, and possessed of many excellent qualities, succeeded his father as nominal head of the Afgháns. Súltán Bahlol Ludhí, and his son Sikunder, emperors of Hindústán, were on friendly terms with him, and sent him from time to time various costly presents. This produced great envy in the hearts of the pretenders to the chieftainship, and they despatched agents with presents to these potentates. Their agents without being admitted to an audience even, were dismissed with the answer, that the Súltáns neither knew of, nor recognized any other head of the Afgháns than Malik Bámí. He had four sons—Sálih, Ali, Zaiyl, and Warukah. They were fathers of large families, and their names have been perpetuated in the separate clans, bearing their respective names.

Bámí died at an advanced age, and the shadow of chieftainship which now alone remained, descended to his eldest son Sálih, who became head of the Habíbzo'e tribe, which consisted of the three smaller ones of Alí, Zaiyl and Warukah, just mentioned, who acknowledged and supported his authority. He was a man of great piety and generosity, and his threshold was never clear from the

crowds of poor, nor his table from the numerous guests. In his lifetime Shír Shah, and Salím Shah, who were of the Shorkhail branch of the Afgháns, sat on the throne of Delhí; and the friendship which had sprung up between his father and the Lúdhía Emperors, was renewed and kept up with the former princes also. At length the vicissitudes of fortune wrested the sovereignty from the grasp of the Ludhís, and placed it in the hand of the Moghal; but when Shír Shah in the year 951 of the Hijerah,* sallied forth to regain the throne of his ancestors, the Afgháns assisted him with a powerful force of their countrymen, and Hindústan was regained. When the agents of Malik Sálih presented his letter of congratulation to Shír Shah, the Emperor observed to his ministers and court, that Malik Sálih was not only his own chieftain, but that his forefathers, from the time of Malik Afghán, were the chiefs of his forefathers also; and that the family of Malik Sálih had no equal in rank amongst the whole of the Afghán tribes. Shír Shah, after thus acknowledging Sálih as his head and chief, and treating his agents with great distinction, dismissed them with numerous presents for their master.

"At length in the reign of Sháh Tamásíb, Sufawí, in the year of the Hijerah 965, on the night of Monday the 17th of the month Zú'l-híjjah; the bright orb of Saddo rose from the eastern horizon of the black goat's hair tent of Malik Sálih, and diffused his refulgent beams on the surrounding world."

With the birth of Saddo, the ancestor of the great Ahmed Shah, Abdálí, the Introduction to the Tazkirát-ul-Mulúk closes.

Sir John Malcolm's words on the origin of the Afgháns are—"Although the right of the Afgháns to this proud descent is very doubtful, it is evident from their personal appearance, and many of their usages, that they are a distinct race from the Persians, Tartars, and Indians, and this alone seems to give credibility to a statement which is contradicted by so many strong facts, and of which no direct proof has been produced."

Sir William Jones was of opinion that the Afgháns are the Paropamisadæ† of the ancients, but this is very improbable, for it is proved by the statements of many authorities, besides that of the

* A. D. 1544.

† See Quintus Curtius's Life of Alexander. Book 7.

work from which I have given an extract, that the Afgháns are not the aborigines of the country they at present inhabit, but have gradually advanced from the west of Asia, and it is not improbable, but that during the lapse of ages, they might have been forced from various causes, to emigrate from the districts in the vicinity of Jerusalem, as stated in the tradition I have quoted. The Seah-Posh Kafirs are in all probability the Paropamisadæ of the writers of antiquity, respecting whom, on some future occasion, I hope to offer some remarks.

According to the Makhzan Afgháni, after Feridún's victory over Zohák, the latter was subjected to such acts of tyranny, that his children fled for safety to the mountain tracts of Ghor, which at that time was only inhabited by a few scattered tribes of the Israelites, Afgháns, and others. If Jewish families could, at that period, have been inhabitants of Ghor, it is equally possible that the Afgháns themselves might have come originally from the Holy Land.*

The mountain districts of Afghánistan heard not the "Allah Akbar" of the conquering Arabs, until the fourth or fifth century of the Hijerah, by which time the sun of their power had commenced to wave. Up to this time even, we find that the Kafirs or Infidels inhabited the mountain districts of Ghor, and continued to dwell there up to the thirteenth century of our era, when Marco Polo visited those regions.†

The Yúsufzo'e tribes, who now hold the whole of the districts to the north of the Lundy Sind, or Kábul river,‡ were even in the time

* In the reign of Saosduchinus king of Babylon, called in scripture Nabuchodonosor the First (A. M. 3335. Ant. J. C. 669) the prophet Tobit, who was still alive and dwelt among other captives at Nineveh, a short time before his death, foretold to his children the sudden destruction of the city, of which at that time there was not the least appearance. He advised them to quit the city before its ruin came on, and to depart as soon as they had buried him and his wife. The Jews, at this time being captives, to follow the advice of Tobit, would have had in the first place to have escaped from Nineveh by stealth, and having accomplished this much, where could they hope to find a more secure retreat, than towards the east, and in the direction of the mountainous tracts now inhabited by the Afghán tribes? See Tobit C. XIV. V. 5-13.

† Travels of Marco Polo; Marsden's Translation. Book I. Chap. 22. pp. 122.

‡ *Lundy Sind*, in Pushto signifies the "Little river," in contradistinction to the *Abu Sind*, or "Father of rivers," as the Indus is termed.

of Báber but new comers, and in this, his statement agrees with the account in the Tazkirát-ul-Mulúk. In another place Báber mentions the people of Bajawer, as "rebels to the followers of Islám, and besides their rebellion and hostility, they followed the custom and usages of Infidels, while even the name of Islám was extirpated from among them."* From this it appears that the people of the country had been converted to Muhammedanism, and relapsed again to idolatry, but were *not* Afgháns.†

Nowáb Allah Yár Khán, son of the Nowáb Háfiz Rahmat Khan,‡ in the preface to a lexiographical work of which he is the author, states, that "there are two divisions of the Afgháns, whose language also differs in many respects, so that the words used by some tribes are not known to, or understood by, others. They are termed Pushtún and Pukhtún and they speak the Pushto and Pukhto§ respectively. The former is the western dialect, having some affinity to the Persian, and the latter the eastern, containing many Sanskrit and Hindí words. The people who dwell about Kábul, and Kándahár, Shora'wak and Pishín, are designated Bar Pushtún or upper Afgháns from بر *above;* and those occupying the district of Roh, which is near Hind (India) are called Lar Pukhtún or lower Afgháns from لر *below.*"

He describes Roh, about which has been, and still continues to be, great diversity of opinion, as "bounded on the east by Suwat and Káshmír, west by the Helmund river, north by Káshkár or Chitrál and Kafiristán, and south by the river or sea of Bukker, called in Persian Níl-áb, (The Blue Water) and Níl'aow or Abá-Sin, (The Father of Rivers) by the Afgháns."

The author of the Ferang-i-Jehángírí gives a somewhat similar account of it; "Roh," he says, "is the name of a range of lofty mountains, in length extending from Suwat and Bajour, to Síwní, which is in the district of Bukker in Sind, and from Hassan Abdál

* Báber's Memoirs, page 248.

† "Although Bajour, Sewad, Peshour, and Hashnagar, originally belonged to Kabul, yet at the present time some of these districts have been desolated, and others of them entirely occupied by the tribes of Afgháns, so that they can no longer be properly regarded as provinces." Ibid, page 141.

‡ The author of the Khullasat-ull-Ansáb.

§ Merely in substituting sh for kh, z for g, etc.

(in the Sínd Ságur Doába, of the Panjáb) to Kándahár in breadth, and in this highland range the latter city is situated."

I have been told by Afgháns in the vicinity of Pesh'áwer, and other places, that their ancestors first came from a district named Ghwárí Margháb, which they said lies to the westward of Khorásán. This is, however, a mistake; a small village bearing this name, and the place referred to by them, is situated about mid-way between Kándahár, Shoráwak, and Girishk, which is one of the old seats of the Afghán tribes who now occupy the Pesh'áwer valley. Ghor, supposed to have been the original district of the Afghána, lies much to the north. It was from this latter place that the Ghorián tribe issued in the year 1152. A. D. when they overturned the throne of the Ghazníwíd Súltáns.

The diversity of opinion regarding the origin of the Afghána, is not greater than that respecting their language, of which, at the time I write, with the exception of a small brochure by the late Major R. Leech of the Bombay Army, no grammar exists.* I have just completed a grammar which, together with a dictionary in preparation, will, perhaps enable the learned both of Europe and India, to give a better, and more decided opinion than heretofore on the affinity of the Afghán language to those of ancient Asia.

Sir William Jones's opinion was, that the Pushto or Pukhto language has a manifest resemblance to the Chaldaic, but Professor Klaproth vehemently denies this, and states, that nothing whatever is known regarding this dialect; that neither in words or grammatical structure, is there the slightest resemblance between Pushtú and any Semitic language, and that it is unquestionably a branch of the great Indú Germanic division of languages.†

The Baptist Missionaries of Serampúr again consider the Pushto and the Belúch‡ languages, to form the connecting link, between those of Sanskrit, and those of Hebrew origin.§ M. Adelung, in his

* Since writing the above, Captain Vaughan of the Bengal Army has published a Grammar.

† It is to be hoped the Professor will change his opinion now, as regards the latter part of this sentence.

‡ The Beluchkí is a mixture of Persian, Sindhí, Hindí, and Sanskrit, with some original words.

§ They also notice the numerous pure Hebrew roots to be found in Pushto.

Mithridates vol. 1st, page 225, considers Pushto an original and peculiar dialect, but at the same time acknowledges his acquaintance with it to be very slight.

Mr. Elphinstone, in his work on Kabul, vol. 1st, page 302, with reference to the Afghánian language, considers that its origin cannot be easily discovered. He remarks, "a large portion of the words that compose it, as also most of the verbs and particles belong to an unknown root, and in this portion are included most of those words, which from the early necessity for designating the objects they represent, must have formed parts of the original language; yet some of this very class belong to the Zend and Pihlavi, such as the terms for father and mother, sister and brother." He also further states, that out of two hundred and eighteen Pushto words, not one had the smallest appearance of being deducible from any of the Semitic languages, but that a resemblance (five out of one hundred and ten words) can be traced between it and the Kúrdish, considered to be an Indú-Germanic tongue.

One of the most decided proofs against the erroneous idea that the Afgháns are the aborigines of the territory they at present inhabit and that the Pushto is the original dialect of those countries, consists in the facts brought to light in the decyphering of the Bactrian, and Indú-Scythian coins. M. Lassen in his interesting and erudite work* on this subject, very truly observes; "I indeed know that some have pretended to recognize the Afgháns in eastern Kábul, even as early as Alexander's time; not so Mr. Elphinstone,† who rather proves their immigration into Kábul at a much later period. This conjecture has originated with professor Wilken‡, who thinks he recognizes the Afgháns in the Assakanes. If these were indeed Afgháns, the Afghán language would have been spoken throughout Kábul, and the language of the coins must be the source of the Pushto. Without observing, that neither ancient authorities nor modern Afghán history§ admit or require this supposition, the cor-

* Points in the history of the Greek and Indú-Scythian Kings in Bactria, Kabul, and India. Page 116.

† Account of Kábul. Volume II. pp. 10, 33, 44, 50 & 56.

‡ Abhandlg. der Berlin, Acad. 1818-19 p. 261.

§ Báber does not mention any thing about Afgháns at Kábul, when he took that city.

rect assertion of the learned academican himself, that the Afgháns belonged to the Medo-Persic tribe, is at variance with it; the Assakaues inhabited a country, where even in the 7th century A. D. an Indian language was spoken."

As the learued professor urges—if the Afgháns were the aborigines of the countries they at present inhabit, the Afgháuian language must, as as a matter of course, have been generally spoken. Had such been the case, the language on the coins, must have been the source of Pushto, but no similarity whatever exists between them.

The Afgháus, although subdivided into numerous tribes, are undoubtedly one race, and speak one original language. Had they been the aborigiues of the couutry at present known as Afghánistán, we must have heard something of them from ancient writers, for we find that even in the time of Herodotus, Darius had sent an exploriug expedition under Scylax of Caryanda and others as far as the Indus.* That the whole of the regions west of Jelálábád or even as far west as Kábul, were peopled by a Hindú race, most ancient writers agree to, as also that they were of different tribes, and spoke differeut languages. Herodotus says—" There are many nations of Indians, and they do not speak the same language as each other; some of them are Nomades, and others not."†

Again the father of History observes. " There are other Indians bordering on the city of Caspatyrus and the country of Pactyica, settled northwards of the other Indians, whose mode of life resembles that of the Bactriaus."‡ The country here referred to, the same as Scylax aud his companions started from on their voyage down the river, is the present district of Pakhlí, north of Attak. The Indiaus are in all probability the aucestors of the race who still occupy that district, the Suwatees, and the people of Astor and Gilgit.

* " A great part of Asia was explored under the direction of Darius. He, being desirous to know where the Indus, which is the second river that produces crocodiles, discharged itself into the sea, sent in ships both others on whom he could rely to make a true report, and also Scylax of Caryanda. They accordingly, setting out from the city of Caspatyrus and the country of Pactyice, sailed down the river towards the east and sunrise to the sea." Melpomene IV. 44.

† Ibid. Thalia. III. 98.

‡ Thalia, III. 102.

It is therefore evident that the Afgháns have immigrated into their present territories from the westward,* and that the aborigines, the Seah Posh Kafirs, or Black-clad Pagans, the Suwatees, and the people inhabiting the hills to the north-east of Suwat, on the one side, and possibly the Belúchis and Jats on the other; have been forced by the gradual advance of this powerful race, to move to the north-east and south-west respectively.

* The empire of the Great Cyrus extended, according to the best authorities, from the Ægean to the Indus, and from the Euxine and Caspian to Ethiopia and the Arabian sea. As it was customary to transport a whole tribe, and sometimes even a whole nation from one country to another, and as the Jews were ever a stiff-necked race, is it not possible, that the Great King may have transported some of the most troublesome amongst them to the thinly-peopled provinces of the east, where they would he too far away from their native land and captive countrymen to give trouble in future? Or, as I have remarked in another place, is it not probable as well as possible, that those of the Jews who could effect their escape, might have fled eastward, preferring a wandering life in a mountainous country, with independence, to the grinding tyranny of Cyrus's successors and their Satraps? In fact there was no other direction to which they could have fled, except towards the north, inhahited by the Scythians who would have massacred, or at least made slaves of them or sold them as such; or eastward, which being mountainous and but thinly peopled, was likely to afford them a permanent and secure retreat. According to Ní'ámut Ullah, Zohak's children, to escape the exterminating vengeance of Ferídún, fled for refuge to the Kohistan of Ghor, and settled there; and at his time, its only inhabitants were some scattered tribes of the Israelites, Afgháns, and others.

There are a number of Jews to be found in the south-west parts of India, and in the Bombay Army there are a great number. Where did they come from? and when did they come?

Again in the 5th year of Darius (A. M. 3488; Ant. J. C. 516.) Babylon revolted and could not be reduced until after a seige of twenty months. It is therefore probable that the Jews, of whom a considerabie numher remained at Babylon, went out of the city hefore the seige was formed, as the prophets Isaiah and Jeremiah had exhorted them long before, and Zachariah very lately in the following terms: "Thou daughter of Zion, that dwellest with the daughter of Babylon, flee from the country and save thyself." Isaiah. xlviii. 20. Jeremiah l. 8 li. 6, 9—45. Zachariah ii.

It also appears that Ochus son of Artaxerxes Memnon, carried a number of Jewish captives into Egypt, and many others into Hyrcania, where he settled them on the coast of the Caspian A. M. 3653, Ant. J. C. 351; might not some have been sent eastward also? See Solin. C. 35, Euseb. in Chron. etc.

I formerly entertained an idea that some affinity might exist between Pushto and the language of that strange people, the Gypsies, but subsequent enquiries have convinced me to the contrary; and I find that no trace of similarity exists between them. This may also be seen by reference to a comparative table of languages which I shall shortly publish.

Whether the Afghánian language be a dialect of the Semitic, of Zend or Pihlavi origin, or of the Indian stock, I will leave for others better qualified to decide. Before entering into any investigation on the subject, it must be borne in mind, that "no efforts of the learned, can ever so far alter a language, as to deface every line of resemblance between the speech of the present day and that of even the remotest ancestry: nothing but the absolute extirpation of the aboriginal natives can apparently accomplish so singular a revolution."* As an instance of this, we have merely to examine the present language of Persia, and the different dialects of the continent of India; or for a still more convincing proof, to look into the Gothic and Celtic original of the modern European languages, amidst the polish and refinement of the Greek and Latin.

Before bringing these rambling remarks to a close, I must notice a few of the most striking peculiarities of the Pushto language, which will, in some measure, serve as a guide in investigations as to its origin and affinity to the other dialects of the Asiatic continent. It will however be well, first to point out the best and most effectual method of ascertaining the *real* affinity of oriental languages.

Baron William Humbolt, in an essay on this highly important subject remarks; "I confess that I am extremely averse to the system which proceeds on the supposition that we can judge of the affinity of languages merely by a certain number of ideas expressed in the different languages which we wish to compare. I beg you will not suppose however, that I am insensible to the value and utility of the comparisons: on the contrary, when they are well executed, I appreciate all their importance; but I can never deem them sufficient to answer the end for which they have been undertaken; they certainly form part of the data to be taken into account in deciding on the affinity of languages, but we should never

* Richardson's Dissertation, etc.

be guided by them alone, if we wish to arrive at a solid, complete and certain conclusion. If we would make onrselves acquainted with the relation between two langnages, we ought to possess a thorough and profound knowledge of each of them. This is the principle dictated alike by common sense and by that precision acquired by the habit of scientific research.

"I do not mean to say, that, if we are unable to attain a profound knowledge of each idiom, we should on this account entirely suspend our judgment: I only insist on it that we should not prescribe to ourselves arbitrary limits, and imagine that we are forming onr judgment on a firm basis, while in reality it is insufficient.

"But further, I am convinced that it is only by an accurate examination of the grammar of languages, that we can pronounce a decisive judgment on their true affinities.

"If two languages, such for instance as the Sanskrit and the Greek, exhibit grammatical forms which are identical in arrangement, and have a close ánalogy in their sounds, we have an incontestible proof that these two langnages belong to the same family.

"The difference between the real affinity of languages, which presumes affiliation as it were among the nations who speak them, and that degree of relation which is purely historical, and only indicates temporary and accidental connexions among nations, is, in my opinion, of the greatest importance. Now it appears to me impossible ever to ascertain that difference merely by the examination of words; especially, if we examine but a small number of them.

"But whatever opinion may be entertained with respect to this manner of considering the difference of languages, it appears to me at all events demonstrated: First, that all research into the affinity of languages, which does not enter quite as much into the examination of the grammatical system as into that of words, is faulty and imperfect; and, Secondly, that the proofs of the real affinity of languages, that is to say, the qnestion whether two languages belong to the same family, ought to be principally deduced from that alone; since the identity of words only proves a resemblance snch as may be pnrely historical and accidental."

There are nine letters of the Arabic alphabet which never occur in pure Afghánián words,—ث, ح, ذ, ص, ض, ط, ظ, ع, غ, and ف, and

therefore the language really contains but twenty-nine letters, including five peculiar ones, to which, after a careful comparison of six hundred alphabets, I find that there is no similarity as to form or sound, either in Arabic, Zend, or Sanscrit, but characters similar in sound are contained in most of the Semitic, and some Tártárían dialects. The Pushto letters with the corresponding ones in the languages referred to are as follow.

ځ *ts* or *tz*, pronounced *tse* or *tze*, has an equivalent in the Chaldaic ס *ts*, Hebrew צ *tsóde*, Samaritan  *tsáde*, Syriac  *tsode*, Ethiopic and Amharic  *tza*, Armenian ձ ծ *tsa*, Palmyren  *ts*, Phœnician  or  *ts*, Punic  *ts*, Kufic  *ts*, Georgian  *ts*, Mongolish  *ts*, Mandchú  *tsa*, Thibetan  *ts*, Albanian  -  *ts*, Corean  -  *ts*, and the Japanic  -  -  - *tse.*

ځ *dz* or *ds*, pronounced *dze* or *dse*, similar to the Hebrew ז *dsain*, Aramáic  *ds*, Palmyren  *ds*, Phœnician  *ds*, Kufic  *ds*, Syriac  -  *dzain*, the Assyrian cuniform  -  *dz* or *ds*, Armenian ձ ծ *dza*, Greek ζ *zeta*, Georgian  *ds*, Mongolish  -  *ds*, and Corean  -  *ds*, Mandchú  -  *ds*, Japanic  *dz.*

ړ *urṛay*, for which with perhaps the harsh *rh* of the Armenian ռ *r*, there is no equivalent in any of the known dialects of the old world. Some persons and among them Major Leach, have considered the Sanskrit lingual ड as similar in sound, but it is merely necessary to hear it pronounced by an Afghán mountaineer to convince any one of the total difference, indeed, it is almost impossible to give a proper idea of its sound in writing. Kufic  *r*, is like it in form. خ khin bears some similarity to the  -  *k'ch* of the Chaldaic, and with this exception, no sound like it is to be found amongst the letters of the six hundred alphabets before referred to.*

ښ or ڼ *'urṛún*, is a combination of the sound of *s'urṛay* and ن *nún*, the latter nasal. It is quite impossible to acquire the real pronunciation except from an Afghán mouth when using the word باښ

* See Die Schriftzeichen des gesammten Erdkrieses. Vienna. 1851, also, Alphabete orientalischer und occidentalischer Sprachen zum Gebrauche für Schriftsetzer und Correctoren. Leipzig. 1850.

the *eye-lash*, or نرې *stone*. The ن *'rán* of the Sindian language is something like it.

Pushto also, like the Semitic dialects, of which family I am inclined to consider it, has the *t'h* with a strong aspiration to which sound the Persians have an unconquerable antipathy; indeed their mouths seem to be so formed as to be unable to utter it. Like the Jews and Egyptians, as well as the Arabs, the Afgháns uniformly give the hard sounds, *t'h*, *d'h*, *ds*, *dtz*, *dz*, etc., to those characters which the Persians have ever softened to *z* and *s*. The pronunciation too, is somewhat difficult on account of the use of several gutturals, and the combinations of such letters as خک, کښ, شپ, etc., which are difficult to enunciate.

In harshness of pronunciation, and in the declensions of its nouns, it bears great resemblance to the Zend and Pehlavi, and like the former language, can be, and often is, written in old works, on which alone we can place dependence, by distinct letters in the body of each word, instead of introducing the short vowels. Of the affinity of the Zend and Sanskrit at present there is no doubt, but the Pehlavi appears to have a greater affinity to the Arabic, and to differ little from the present language of Persia.*

In Arabic and Persian it is impossible to sound a consonant which may be the first letter of a word, without the aid of a vowel, whilst in Pushto there are numbers of words beginning with a consonant immediately followed by another; as, شپه *shpak*, night, ورځ *rwadz*, day, غلا *ghlá*, theft, پنکته *khkatah*, below.

The vowels and consonants used in Pushto have the same powers as those of the Arabic, Hebrew, and other Semitic dialects. Like them it has two genders—the masculine and feminine, but the former have a dual form, which is wanting in the latter. In this respect the Afghánián also differs from the Zend and the Sanskrit, but agrees with the Pehlavi, from which the modern Persian is derived. In common with the Hebrew, Arabic and Persian, it has the peculiar separable and inseparable pronouns, the latter being

* Sir William Jones has stated, that "having compared a Pehlavi translation of the inscription in the Gúlistán on the diadem of Cyrus, and from the Pázend words in the Ferang-i-Jehangírí, he became convinced that the Pehlavi is a dialect of the Chaldaic."—Asiatic Res.

invariably attached to some preceding word, whether a noun, verb, or particle. When attached to nouns they signify possession or propriety, and with intransitive verbs in the course of conjugation, are used in the place of personal pronouns, and with transitives point out the objective case.* This is also a peculiar feature of the Sindían language, which has several letters in common with Pushto besides its own peculiar ones. The inflexions of the Afghániáu verbs too are formed, inflexions are conjugated according to the Arabic and Hebrew system, with two original tenses only—the *mází* or past, and the *muzárœ* or aorist, the past participle being used in the construction of the compound tenses, with the aid of the auxiliary, *to be*. Another peculiarity is, that the intransitive verbs agree in gender with the nominative, whilst the transitives are governed both in gender and number by the objective case. In many respects the Pushto syntax agrees with that of the Hebrew, and I have no doubt but that much greater affinity will be found to exist between them, if compared by any one well versed in the latter language.

The Pushto language is spoken with considerable variation in orthography and pronunciation, from the valley of Pishín south of Kandáhár, to Kafiristáu on the north; and from the banks of the Helmand on the west, to the Attok, Sindhu, or Indus on the east—throughout the Sama or Plain of the Yusufzo'es, the mountainous districts of Bajawer, Pánjkora†, Suwat, and Bunír, to Astor on the borders of Little Thibet—an immense tract of country equal in extent to the entire Spanish peninsula.

The numerous convulsions to which the country of the children of Afghána has been subjected for the last seventy or eighty years, have necessarily affected their language also; hence the great variation observable in the orthography and mode of writing of modern Pushto works. On this account, no dependence whatever can be placed on any manuscript of later date than the reign of the founder of the Durání empire—Ahmed Shah Abdáli—authors—for it is almost impossible to find two copies of one author, unless written by one person, agreeing on these essential points. I have in my

* See Hebrew Grammar by Prof. Lee, p. 80, Art. 153, p. 260, Art. 220. London. 1827.

† *Kor* is the Pushto for house, and *Pánj* the Persian for five.

possession a rare prose work, which was written in the reign of the Emperor Aurengzeb, which I picked up in a most out-of-way place,—a pawn shop at Bombay. The mode of writing and orthography in it, I have generally adopted, together with that of the Makhzan Afgháni, in my grammar above alluded to.

The assistance which I have derived from a knowledge of the dialects of the neighbouring territories, to six of which I have devoted many years, has been very great, indeed more than I can well express. It has enabled me to trace words of Arabic, Persian, Túrkí, Sanskrit, and Hindí origin, greatly garbled in orthography, and vitiated in pronunciation, which a person unacquainted with them in any way, would in all probability set down as pure Pushto.

As an example of this, I will mention one instance alone. M. Klaproth in his apparent eagerness for classing the Belúch language, which is a mixture of Persian, Sindhí, Panjábí, Hindí, and Sanskrit, amongst the Indú-Germanic family of tongues, commits an error, from, I fancy, ignorance of the Persian language. He gives the following table :*

Beluch.	*German.*	*Latin.*	*Greek.*	*English.*
Shash	Sechs	Sex		Six
Hapt		Septem	Hepta	Seven

Now the Persian for six is شش *shash*, and seven is هفت *haft*, which two words,—to all appearance have a greater affinity to the Belúch words here mentioned, than to either German, Latin, Greek, or English; in fact they are precisely the same words, for ف is used for and pronounced پ indiscriminately, and would be written exactly the same in both languages. If we consider that Belúchistán is merely separated from the Persian province of Kirmán by a range of mountains, the similarity is naturally accounted for, without leaving Asia for that purpose, as the learned Professor appears to have done—"*Ea sub oculis posita negligimus : proximorum incuriosi, longinqua sectamur.*"

Unlike most Eastern nations, the Afgháns appear to regard women in a great measure on an equality with themselves, in this world at least; and the latter generally receive some sort of education.

* I am indebted for this to Thornton's Gezateer.

Some of the Afghán females of the higher class, are famous for their knowledge of Pushto which they read and write. The daughter of the late Dalíl Khán, Arbáb, or chief of Torú,* near Pesháwer, is celebrated for her learning, and general proficiency in the Afghán language. Pesháwer, some fifty or sixty years since, was one of the principal seats of Muhammadan learning, and by many was considered a more learned city than even Bokhárá itself.

The custom is for boys and girls of from five to twelve years of age to go to the same school. After learning the letters they immediately commence reading the Korán in Arabic, but of course without understanding it. On its completion they begin to read some Púshtú work usually a commentary on the Korán, or an explanation of the rites and ceremonies of their faith, such as may be found in the work entitled Rúshíd-ul-Ay'án, or some such religious subject. After the twelfth year, the girls either attend a dame's school, or, if their parents can afford it, are taught at home. Sometimes boys under twelve years of age, go to a dame's school with grown up girls of fifteeen and upwards; but this custom is only prevalent at a distance from towns, as in most large places there are separate schools for males and females. The scholars either pay a small sum monthly to their teacher, or make him a present after having completed the perusal of the Korán, according to the position and means of their parents. Amongst some tribes a portion of land is allotted to the Mulla or Priest, who also acts as village schoolmaster.

The Afghán language, taking all things into consideratiou, is by no means poor in literature. There are numerous poets, of whom Abd-ur-Rahmán who flourished in Aurengzeb's time, is perhaps, the best known and most generally esteemed. He was a Mullá or Priest, and his writings, which are of a religious character, are collected in the form of a Dewán—the form in which most of the poetical works are arranged.

The next most popular poet is Khushhál Khán who was chief of the powerful clan of Khattak in the time of the Emperor Aureugzeb,

* Torú, or Tolú, is a town or cluster of villages in the Yúsufzo'e country, about eleven miles north of Nohshaira, and containing about 5000 inhabitants.

and passed his life in struggling against the oppressive power of that monarch. The following verse from a poem written during his confinement in the fortress of Gwalior by the Emperor, is characteristic of the man.

Cheer up then heart! I have by me,
A healing balm for every throe—
That Khúshhál Khán's an Afghán true,
Aurengzeb's mortal foe.*

Khushhál was also author of a History of the Afgháns, which work is now very rarely obtainable, and of a translation of Pilpay's Fables (the Anwárí Sohelí of the Persian) entitled Æ-yár Dánish, or the "Touchstone of Wisdom. He also wrote a small volume on the forms of prayer, and other religious matters.

The poems of Ahmed Shah, Abdálí, the great founder of the Durání monarchy, and conqueror of the Múrathí host at Paníput, are principally in an amorous and metaphysical strain, and contain a number of difficult Arabic words. His poetry is highly esteemed, perhaps more so, than its merit demands.

The next author to be noticed is Mullá Abd-ul-Hamíd who flourished in the time of Timúr the son and successor of Ahmed Shah. His odes which are mostly of an amorous or moral tendency contain many fine sentiments. He is the Shaik Saadí of the Pushto, and I must say, that I prefer his works to any of the others. His works are entitled, Dur-wo-Marján—Pearls and Corals.

Futtih Khán, Yusufzoe,† surnamed Mirzá, the next poet in point of popularity was a Súfi, and his works are a mass of mysticisms. He served in the wars of Aurengzeb in Guzerat and the Dekkan in 1686 and the following years.‡

Kasím Ali Khán of the notorious tribe of Afrídí, is the author of a Dewán, but his odes also bear the stamp of mysticism. He was born at Furakábád in India, in the time of Nowáb Muzaffar Jung,

* I regret that want of space will not allow me to give the poem entire.

† Some say he was of the family of Bázíd (Báyízíd) Ansárí, the founder of the Roshníán sect, called Pír Tárek or Saint of Darkness, by Akhund Darweza.

‡ I have in my possesssion the copy of his works which belonged to the Hon'ble Mr. Elphinstone.

and according to the account given of himself in one of his odes, he was acquainted with Afghání, Arabic, Túrkí, Persian, Hindí and a little English. He has devoted one entire ode to the abuse of the English, just arrived in India, whom hee alls "a nation of shop-keepers, who in Hindustán have turned into soldiers."

The romantic and interesting poems of Saif-ul-Mulúk and Badrí Jamál, by Gulám Muhammed, and Bahrám Gur, by Fy'áz, must not be overlooked. The authors who are but little known, are said to have flourished in the seventeenth century, which appears to have produced most of the Pushto authors.

The other poetical works most generally known are, The Tale of Súltán Jumjumah by Emám-ud-Dín, Mæraj Nameh by Gulám Muhammed, Rashíd-ul-By'án by Akhund Rashid, Mukhammas of Abd-ul-Kádir, Majmúæát-i-Kándahárí, and some others of less note.

The prose writings are numerous, but with the exception of the romantic story of Adam Khán and Durkhání mentioned by Mr. Elphinstone in his "Account of Kábul," and a few others, they are mostly on divinity. The principal are, the Fawá'id-ush-Sharri'æa, written by Akhund Kásim in 1560; Makhzan Afghání by the celebrated Akhund Darwezah* who lies buried at Pesh'áwer; the works of Bábú Ján, said to have been a converted Seah Posh Kaffir who again relapsed; the Jung Nameh containing the history of Hussan and Hussain, by Gulám Muhammed; Núr Nameh by Ján Muhammed; Gúlistán-i-Rahmat by Nowáb Muhammed Mustajib Khán in 1800; Tafzír—a translation from the Koran; Hazár Masá'íl; Hiyát-ul-Mumínín; Akhír Nameh: and several others.

Besides the original Afghán writings, there are also numerous translations from Arabic and Persian authors, both poetical and prose. Amongst those which have come under my own observation are, the Gúlistán of Saadi, translated by Amír Muhammed, Ansárí; Yúsuf and Zulíkhá of Jámí, by Abd-ul-Kádír; Majnún and Laila of Jámí,

* Professor Dorn in his Chrestomathy states that Akhund Darwezah was the first author who composed in the Afghán language, but he neither states how he has arrived at this conclusion, nor his authority for such a statement. In the same manner he considers Khushhál Kháu to be the author of Adam Khán and Durkhání, but neither the one nor the other is actually known.

by Bai Khán of Bunír; the Kasídah Surí'ání; and the Kasídah Bardah by Akhund Darwezah.*

There are two valuable lexicographical works, the Rí'az-ul-Mahábbat (Gardens of Friendship) by the Nowáb Háfiz Mahábbat Khán, compiled at the request of Sir George Barlow in 1805-6. It is an extensive work of about 700 pages small folio, but is chiefly devoted to the conjugation of the Afghán verbs, which are exceedingly difficult from their irregularity. The author however was a native of Hindústán, and many peculiarities regarding the verbs and tenses, have been omitted. The vocabulary is valuable. The other work entitled Æ-ajá'íb-ul-Lughat (Curiosities of Language) was written about the year 1808, by Nowáb Alláh Yár Khán of the Barech tribe who was also a native of India. The work contains 640 pages of 17 lines to a page.

Kasim Ali Afrídí, in one of his odes, besides the authors already mentioned, gives the names of several others—Dowlat, said to have been a Hindú, Meher Alí, Sikunder, Ashráf, Arzání, Mukhlis, Karim Khán, Kázím Khán surnamed Shaidah, Allah Dád, Karím Dád, Fázil, Latarr, and Meher Shah, but they are little known.

There is a host of ballad writers, and some of their compositions, sung by the wandering minstrels are very spirited, and put me in mind of those of our own land. During my residence ut Pesh'áwer I had several of them written out. The following is a specimen of one which I have attempted to turn into English ballad style, re-

* The so-called translation of the Old and New Testaments made by the Serampore Missionaries in 1818, bears a very slight resemblance to the sacred writings; in fact it is quite ridiculous and quite painful to read. I will merely give one specimen, the well known verse from the Sermon on the mount—"*Judge not, that ye be not judged.*" the Pushto is in the following terms د انصاف مکوئي دپارهٔ دیهٔ چهٔ انصاف کړي شوي بهٔ نشيئي *Do not justice unto any one, lest justice shall be done unto you! ! ! ! ! !* Is this Christian doctrine? verily, if the Infidels are to judge of our religion from such translations as this, it is not to be wondered at that they should scoff at, hold our faith in ridicule, and call us Káfirs or Blasphemers. It is quite evident that in making this translation the English has been merely transposed for the Pushto without the slightest consideration as to difference of idioms, style, and arrangement of the languages. I trust the other translations of the Scriptures are better than the Pushto one.

taining in some measure the metre of the original. The translation is almost literal.

The Fight at Nohshaira.

The battle of Nohshaira was fought in 1823, between the Afgháns under Sirdár Mahommed Azím Khan, Bárakzo'e, brother of Dost Mahommed Khan, and the Seiks under Runjít Singh, in which Abbás Khan Khattak was slain, besides a host of Yusufzo'es.

In misery and grief I'm plung'd,
By ruthless Fate's decree;
Alas! that from its cruel laws,
There's no escape for me.

What shall I say of Abbás Khán,
That Khattak chief so bold;
At his sad fate I'm sorely griev'd,
And that by me 'tis told.

He first did march to Wuzír Bágh,*
Where cypresses do wave;
And there he muster'd all his clan,
They were like lions brave.

He from Pesh'áwer then did start,
For Azím Khán to fight;
And with five hundred Khattaks true,
He reach'd Nohshair that night.

* The Wuzír Bagh or Minister's Garden lies outside the city of Pesh'áwer to the south. It contains a residence, and was remarkable on account of the number of cypress trees it formerly contained. The garden was laid out by Sirdár Futtih Khan, the celebrated Wuzír of Mahommed Shah, and the brother of Dost Mahommed Khan, Bárakzo'e at present ruler of Kábul. The garden has since been chiefly occupied by the other brother Sultán Mahommed Khan, and his numerous Hárem.

When morning dawn'd, the Seiks advanc'd,
The Afghán host to crush ;
But Gházis* they, on Nának's sons'†
Did like a torrent rush.

On Khaiber's heights, when rains do pour,
And wintry blasts do blow ;
The little rills, to torrents swell'd,
All Jamrúd's plain‡ o'erflow.

That day they kill'd of Singhs enough,
Of heads to raise a dome ;
But 'twas decree'd Nohshaira's plain,
To them should be a tomb.

At eventide, the chieftain's steed,
Fell' midst a heap of slain ;
By night, his band, oh ! where were they ?
Dead on the bloody plain !

Night clos'd round him, still he fought,
All faint and out of breath :
A Hourí's§ hand the Sherbet gives,
The Martyr meets his death—

To spare his life, the Seiks they did
Pledge every sacred word :
No Heav'n they dread—deceitful foes !—
They put him to the sword.

* Ghází—one who fights against infidels : a gallant soldier.

† Nának—the name of the Saint of the Seiks and the founder of the sect.

‡ "Jamrúd's plain"—"After heavy rains in the mountains, the rivulets, swelled to torrents, rush from the hills with violence, and carry every thing before them"

§ Hourí—a black-eyed nymph of the Mahommadan Paradise, of which, every true believer is to have no less than seventy-two.

In Akorá when* this tale was told,
The people were dismay'd;
And when night came, the hero's corse,
They from the field convey'd.

It seem'd the latter day was come,
So sore aggriev'd were they;
And minstrels did their rebeks break,
Deep sorrow to display.

Next morning from Akorá then,
Set out a mournful tram;
And to Pesh'áwer bore the corpse,
Of him so basely slain.

The people of Pesh'áwer wept,
When they his fate did hear;
And then they laid the body in,
The grave-yard of Panj Pír!†

Hakím! lament for Abbás Khan,
That Khattak chief so bold;
Oh where! the like of him, oh where!
Shall we again behold.

* Akorá— is a small town about ten miles west of the Indus or A'tok: it is the chief town of the Khattak tribe.

† "The grave yard of Páuj Pír"—The Zí'árat-i-Pánj Pír, or the shrine of the five saints, is situated about a mile south-east of Pesh'áwer.

Indian Oology—Notes on the Nidification of some of the commoner birds of the Salt Range, with a few additional from Kashmir, by W. Theobald, *Junr. Esq.*

The present paper is the result of observations made during the years 1852-3, chiefly in the neighbourhood of Pind Dádan Khán and Katás, in the Salt Range, with a few scanty notes made during a flying trip of a month to Kashmir.

The only paper on the same subject I have seen is one by Capt. Tickell, with which in one or two instances my own notes will be found to differ. Layard and Kelaart have also given brief notices on the same subject from which one curious fact may be deduced, viz. that the same birds nest at various times in different parts of the country, a fact by no means surprising when the great extent and varied physical, seasonal and climatic features of our Indian empire are taken into consideration.

At present however, we must content ourselves with the careful exploration of particular districts without attempting to follow out the laws which doubtless regulate these seeming anomalies, which would require much more extensive information than we are at present possessed of.

It is not easy to explain why Oology has not found more favour with those whose taste or opportunities incline them to cultivate some of the minor branches of natural science, for without any undue bias it may at least be reckoned as entertaining and instructive, as many of those "ologies" which are usually considered pleasing, and withal, not unfashionable. Many however, who are ready enough conventionally to tolerate other similar pursuits, can, without being able to assign any particular reason, see in Oology little else than trifling and loss of time, but it requires very little examination to upset such an estimate, for there are few similar studies, if any, that surpass it in interest, few more varied, and none offering a less worked field of enquiry and speculation.

What varied and touching instances of craft and devotion does not the maternal στοργη prompt for the concealment and preservation of the callow brood either from natural enemies or from unforeseen perils, and where can we look for more pleasing instances of self-

denial than among birds engaged in tending their eggs or young. This has ever been a favourite and admired subject with poets and lovers of nature, who will not fail to accept in a far wider sense, than originally attached to them, the lines of Flaccus.

> " Non ferox
> Hector vel acer Deiphobus graves
> Excepit ictus pro pudicis
> Conjugibus puerisque primus."

At no time too, are more conclusive proofs displayed by the brute creation of intellectual power, than by birds engaged in the duties of incubation. It appears indeed little less than absurd and a mere prejudice, to deny this faculty to the inferior animals, for if reason be defined in terms, their actions in a greater or less degree will be found to fulfil those terms with those of man himself, without doubt unmeasurably the highest in every respect of living forms, but between whom and the humbler inhabitants of the earth, that abso lute gulph does not exist which his pride—his reasoning pride—has induced him to surmise.

The strong sense of Milton did not fail to see and acknowledge this, for Eve addressing the serpent, says:

> " What may this mean? language of man pronounced
> By tongue of brute, and *human sense* expressed?
> The first at least of these I thought denied
> To beasts, whom God on their creation-day
> Created mute to all articulate sound
> The latter I demur, for in their looks
> Much *reason*, and in their actions, oft appears."

This passage shewing an acquaintance with and appreciation of the habits of animals, far from common at the time he wrote, affords a pleasing insight into the character of our great poet.

I shall now offer a few remarks as to the means I have found best, after some failures and losses, for preserving the fragile objects under consideration, in the hope they may prove of some service to other collectors.

There are three ways which may be adopted for emptying an egg according to its size and the amount of incubation it has received. All eggs when fresh or only slightly incubated may be blown after

a manner I shall now describe, but some eare and careful handling are required to succeed with sueh eggs as of the English wren or Indian palmswift. The ordinary mode which the young idea usually aspires to inculeate into grandmamma is to make a hole at *both* ends, but the plan I adopt is preferable to the infantile eustom, as from requiring a single hole, it does not so much damage or blemish the shell. On deeiding on the proper spot which is best in the side, an oval hole must be made varying with the size of the egg, and on holding the hole downwards the contents are easily evaeuated by blowing into the egg through a fine pointed blowpipe, the lip of which is just introduced within the shell.

The operation is neat and effectual but a violent blast must not be attempted, as in that case the yolk may cause a momentary obstruction and the egg explode from the pressure of the eonfined air within. Neither should the hole be made too large, as the air will then find too ready an exit and fail to expel the last portion of the eontents. The empty shell should then be immersed in water and filled; by first exhausting the air with the blowpipe, this will effectually elean the interior, and the last remains of moisture may be absorbed on blotting paper. The interior should then be washed with a solution of corrosive sublimate in spirits. A common six penny brass blowpipe answers perfectly for this.

When however, the incubation has lasted a long time, a good plan is to extract the contents by means of a pin bent into a hook. This is a tedious operation which I merely mention in case of any rare egg requiring to be so treated. A third plan answers well for all eggs of a large or medium size, when well incubated. A moderately sized hole must be made in the eggs and the more liquid portion of the eontents got rid of. They should then be wiped clean and placed in a shallow pan, when in a few days the maggots of the flesh-fly will consume the contents. They will then only require to be washed; an operation performed with the greatest comfort by one labouring under a severe eold, or glorying in an equally philosophic nose with the ingenuous doetor in "Humphrey Clinker." The best mode of paeking moderate sized eggs in store is in wooden boxes with saw dust, after elosing the holes in the shells with their paper. Tin boxes are not generally to be trusted, at least travelling,

as with such tender charges committed to their care a little smash goes a great way as I have ruefully learned from experience. Small eggs travel well packed in some soft nests as those of "Lanius" with a little wool and placed in wooden boxes. Small tin boxes fitted into trays in a wooden box are also very handy but are not readily got well made in this country.

For the nomenclature adopted in the present paper I am indebted to my friend Mr. Blyth, in several cases from the examination of skins of birds shot off the nest, and with a few exceptions, no reasonable doubt attaches to the correct identification of any bird in the present paper; those to which any uncertainty attaches are indicated by an asterisk.

The tabular form I have chosen as most convenient; the LOCAL NAME is ranged under the specific in the second column, the next contains the MONTH and WEEK in which the eggs are laid, the last column the colour of the eggs and a description of the nest.

In the penultimate column, three heads are contained. The number of eggs; usually ascertained from well incubated eggs, to guard against error. The form of the eggs expressed by letters; and the measurement of the long and short axes in inches and decimals of an inch. The following are the commoner forms in the abbreviations used:

O. Oval.	P. Pyriform.	R. Round.
B. O. Blunt oval.	O. P. Ovato Pyriform.	With some minor combinations.
P. O. Pointed ditto.	B. O. P. Blunt ditto ditto.	
L. O. Long ditto.	L. O. P. Long ditto ditto.	
R. O. Round ditto.	R O. P. Round ditto ditto.	

1 Gyps Bengalensis, ... Gid Girij.	March 1st, 2nd, ...	1. O. P. 3.36 / 2.62	Dull white. Nest of sticks, and twigs in large trees.
2 Neophron percnopterus, ... Safed-doda.	March 3rd, ...	2. L. O. 2.53 2.75 / 1.90 1.84	Pale brownish red, thickly blotched with dark brownish red. Nest, a few twigs placed in holes of cliffs and difficult to approach.
3 Haliœtus Gallicus? Burra ludi.	March 2nd, 4th, April 2nd, ...	1. B. O. = L. B. O. ... 2.78 2.67 3.18 / 2.13 2.30 2.30	Pure white, with sometimes a few spots of brown. Nest of sticks in large tree.
4 Circaetus gallicus, ... Chota ludi.	March 2nd, ...	1. O. 2.49 / 1.90	White with a few minute brown specks. Nest of twigs and sticks in large trees.
5 Poliornis tees-a, ... Trumti.	April 2nd, ...	4. O. P. = B. O. P. ... 1.80 1.93 / 1.50 1.50	Pure grayish or plumbeous white. Nest small, of twigs, in trees, near cultivation.
6 Buteo canescens, Hodgson, ... Hil.	March 1st, 4th, ...	2-3. O. P. 2.00 2.19 / 1.66 1.66	Greenish white, or white, blotched with red or claret brown—vary greatly. Nest large in trees, sticks lined with cotton, rags, &c. and daubed with mud.

7 Lanius lahtora, ...March 4th, April 4th,... 5. O. P. Pale greenish white, blotched and ringed with yellowish gray and neutral markings—vary much in intensity and colour.

Lahtor (generic.) 1.06 / 0.80

Nest of twigs, lined with cotton or wool, and usually placed in stiff thorny bushes.

8 Lanius erythronotus,.....May 1st, 4th, ... 5-6. B. O. P. White or pale greenish white slightly ringed and spotted with yellowish gray and neutral.

0.88 0.93 / 0.81 0.68

Nest of roots, coarse grass, rags, cotton, &c. lined with fine grass and placed in forks of trees.

9 Lanius Hardwickii, ...May 1st, 4th, June 2nd, 3.4 O. P. = B. O. P....Colour same as No. 8, also creamy or yellowish white, spotted with darker.

0.80 0.87 0.73 / 0.64 0.65 0.55

Nest compact, in forks of thorny trees; outside fibrous stalks, bound with silk or spider web and covered with lichens or cocoons imitating a weathered structure; inside lined with fine grass and vegetable down.

10 Corvus-corax, ...January, February, ... 4. O. P. Dirty sap green, blotched with blackish brown; also pale green, spotted with greenish brown and neutral.

Dom-kak Doda. 1.70 / 1.30

Nest of sticks, difficult to get at, placed in well selected trees or holes in cliffs.

11	Corvus splendens, ... Kowa.	June 4th, ...	5. O. P.	1.42 / 1.05	1.40 / 0.95	1.56 / 1.18	1.70 / 0.97	Clear bluish green, spotted with blackish brown, size and colour variable. Nest, a neat but slight cup of twigs and roots, placed in medium sized trees.
12	Columba intermedia, ... Kabuta.	March, April, May, June, July, ...	2. P. O. = B. O.	1.63 / 1.04	1.43 / 1.17			Pure white. Nest none, or only a few twigs in holes, in walls, buildings, cliffs, &c.
13	Turtur risorious, ... Panduk.	April 3rd, May 1st, September 1st, ...	2. P. O. = B. O.	1.21 / 0.96				Pure white. Nest, a few twigs in low trees and bushes.
14	Turtur Senegalensis, ... Ghughu (generic.)	March, April, May, June, Augt., Sept., ...	2. P. O. = B. O.	1.11 / 0.92	1.20 / 0.90			Pure white. Nest, a few twigs in low trees and bushes.
15	Turtur humilis, ...	April, May, June, Augt.,	2. P. O. = B. O.	0.93 / 0.74	1.02 / 0.76			Pure white. Nest, a few twigs in low bushes or trees.
16	Pavo cristatus, ... Mor manjur.	June, July, ...	O. P. = B. O. P.	2.66 / 1.88	2.50 / 2.00			Clear brownish cream colour. Nest, a mere hole in the ground in difficult stony places in the hills.

17	Perdix Ponteceriana, ... Jita.	April 1st, May, Sept., ...	9. P. = O. P. $\frac{1.29}{1.03}$	Clear cream colour. A little grass in a hole in the ground, usually sheltered by a bush: or in clumps of grass.
18	Ammoperdix Bonhami, ... Susi.	April, May, June, ...	12. P. = O. P. $\frac{1.40}{1.00}$	Clear cream colour. A slight hollow among stones in the hills.
19	Caccabis chakor, ... Chakor.	April, May, ...	12. O. P. = B. O. P.	Yellowish white or brownish cream colour, faintly ringed and spotted with tan colour. A few leaves on ground under bushes.
20	Turnix Sykesii ? Bailer (Taigoor.)	August 3rd, ...	5. R. P.	Pale gray closely freckled with dirty yellowish ochre, with a few dots of neutral, and blotched with deep reddish brown or blackish umber. Nest, a little grass hemp yarn, and a few hairs on ground in field of Bájra.
21	Palæornis torquatus, ... Totha (generic.)	May 3rd, ...	4. R. O. P. $\frac{1.25}{1.05}$	Pure white. Nest none, eggs laid in holes, in walls, trees and steep banks in company with No. 12.
22	Palæornis cæruloccphala, ...	March 3rd, ...	4.5 B. P. $\frac{1.13}{0.95}$ $\frac{1.17}{0.93}$	Pure white. Eggs laid in holes in trees.

23 Pycnonotus leucotis, ...May, June, July, ... 4. O. P. White, much dotted with claret red.
0.91
Bulbul (generic.) 0.64
Nest, a neat cup of vegetable fibres in bushes.

24 Pyenonotus Bengalensis, ...May, June, July, ... 4. B. O. P.....Deep pink, blotched with deep claret red.
0.87
0.62
Nest similar to No. 23.

25 Acridotheres tristis, ...June, ... 5. O. P. Pale bluish green.
1.20
Maina. 0.85
Nest roots and other rubbish, in trees or holes in house, Varandas, &c.

26 Acridotheres gingianus,.....May 3rd,..... 7.8 O. P. Clear greenish blue.
1.08
Gang-maina. 0.81
Nest, a hole in the sand at the end of a gallery run into a steep bank, many nests in company.

27 Cypselus affinis, ...April, May, June, Augt., Sept., ...O. P. Pure white.
0.90
Ababil (generic.) 0.56
Nest, light straw and feathers strongly agglutinated to rafters of houses, nests in colonies and often united together, size varies much, some have long necks others are mere saucers without any. Second nests are less carefully built. The inside is not lined, and feels like coarse cardboard.

28 Hirundo Sinensis, ...February 3rd,..... 4. O. P.,Pure white.

0.62 / 0.48

Nest of grass lined with feathers, placed at the end of a gallery in a steep river bank.

29 Oriolus kundoo, ...May 2nd,..... 4. O. P. Pure white with a few black spots.

1.17 1.23 / 0.81 0.75

Nest a neat cup of woven grass, attached by the side to a bough of some fruit tree.

30 Dicrurus macrocercus, ...May, June,..... 4. O. P. Dirty reddish white spotted with red; colours vary; in some the spots seem to have run, as ink does on damp paper.

Jápul kalchit.

1.08 / 0.73

Nest a neat shallow cup of roots and stalks in bushes.

31 Passer domesticus,.....February, March, April, May, June, July, ... 5-6. O. P. White spotted and blotched with brownish black or brownish white blotched with deep brown; colour varies much.

Gurcia.

0.85 0.82 / 0.65 0.61

Nest a loose structure of grass and feathers, in trees or houses.

32 Malacocercus caudatus,.....March, April, May, June, August,.....4.5 O. P. L. O. P.....Clear greenish blue.

Sór.

0.84 1.04 0.75 / 0.66 0.60 0.55

Nest a loose but deep cup of grass and twigs in bushes in jungle or garden. The first size is common, the second and third measurements were from eggs of one nest.

33 Oxylophus melanoleucus, ...August, ... 1. B. O. Deep greenish blue.
0.91
0.81
(Identified by Mr. Blyth.)
This evidently parasitical egg was taken from the nest of No. 32, containing four ordinary eggs which it closely resembles in colour, though its form indicates its parasitical character.

34 Galerida cristata, ...March 4th, May 3rd,... 4. O. P. Yellowish white uniformly freckled, with grayish yellow and neutral.
0.88 0.82
0.66 0.64
Chandul.
Nest, a little grass in a hole in the ground.

35 Thamnolia Cambaicusis, ...April 2nd, ... 4. P. O. P. Greenish white ringed and spotted with pale reddish and a little neutral.
0.79
0.60
Jimma (generic.)
Nest, loose grass and bits of snake's skin in holes in the sides of Nullas.

36 Nectarina asiatica, ...May 4th,..... O. P. Grayish white freckled and ringed with cineritous gray.
0.66
0.47
Nest, a neat purse of vegetable fibre and down suspended from some small bough and masked in front by a few dead leaves loosely attached by silk threads.

37 Munia Malabarica, ...May, August, September, October, December, ... 12. 13. = (25.) Pure white.
O. P. 0.59 / 0.46
0 64 0.60 / 0.44 0.50
Two pairs of birds frequently if not usually are employed in the construction of one nest in which the two hens consecutively lay—so the same nest has sometimes 25 eggs in it, in different stages of incubation—nest often clumsy and hastily made—but usually a neat domed structure of fine grass with one opening, sometimes prolonged into a short deflected neck partially closed by the elasticity of the long spikes of grass forming it; sometimes the nest is a simple platform of grass, open at each end, but the grass ends curved over to meet at the top, usually placed in thorny bushes, often very conspicuously and close to roads. It is much to be doubted if the eggs found occasionally in October and December, are hatched.

1 Podiceps Philippensis, ...August, September, ... 5. P. O. L. P. O. Pure white; when recently laid, green is soon soiled brown in the nest.
1.50 1.42 / 1.04 1.00
Pandubi.
Nest, a few weeds heaped on the rank vegetation of jheels, but floating, and usually several nests together.

2 Gallinula chloropus, ...August 4th, ...O. P. Pinkish cream or gray spotted and slightly ringed with deep red brown.
1.62 / 1.15
Nest as No. 1: eggs also stained by

3 Sarciophorus lilobus, ...May 2nd, ... 3. P. = O. P. creamy yellow or stone colour, thickly spotted and blotched with blackish brown.
1.63 / 1.19
Jithiri.

4 Ardeola leucoptera, Bogla (generic).	June 4th,	5. 6. P. O. 1.54 / 1.16		Pale green. Nest of loose sticks in trees.

Kashmir Notes.

1 Tinunculous alandanus, Shikra.	April 3rd,	6. B. O. P. 1.68 / 1.22	1.51 / 1.27	Pale reddish brown freckled and blotched with brownish red. Nest, hole in sarai wall of Thánna S. of Bárangala Sháhabad and valley generally.
2 Milvus ? Buteo,	April 4th,	2. O. P. 2.10 / 1.80	2.40 / 1.77	Nest and eggs as in plains. (No. 6 ante.)
3 Corvus, Small black Hill Crow.	April 3rd,	4. O. P. 1.70 / 1.20	1.60 / 1.25	Green, spotted with brown, valley generally. Nest placed in "chinar" and difficult trees.
4 Corvus monedula,	May 1st,	4. 5. 6. O. P. L. O. P. 1.26 / 0.99	1.45 / 1.00	1.60 / 1.00 Pale clear bluish green: dotted and spotted with brownish black. Valley generally. In holes of rocks, beneath roofs, and in tall trees.
5 Sturnus vulgaris, Jilgiri.	May 2nd, 3rd,	O. P. 1.15 / 0.85		Pale clear bluish green. Valley generally; in holes of bridges, tall trees, &c. in company with No. 4.

6 Aeridotheres tristis, ...April 3rd, ...Nest and eggs as in plains. Rajaori and lower hills generally.

7 Caccabis chukor, ...May 3rd,..... Nasmána on the Chandra-bága: eggs as ante, No. 19.

8 Pycnonotus leucotis, ...April 4th, at Bhimba, May 2nd at Islamabád. Nest and eggs as in plains; ante No. 23.

9 Hirundo rustica,* May 2nd, ... 4. L. O. P. 0.83 / 0.53 Pure white spotted with bright reddish brown. Valley generally. Nest under eaves, outside coarse straw cemented with mud, inside fine straw lined with feathers.

10 Budytio citreola, ...May 3rd,.....4. O. P. 0.95 / 0.70 Palo gray thickly dotted and ringed with grayish brown and grayish neutral mingled together. A depression in soft earth beneath a rock near Báragari. Valley generally.

1 Anas Boschas, ...May 1st, ...L. O. P. 2.27 / 1.55 Dirty white with a tinge of yellowish green near Supeia valley of Cashmir.

2 *Podiceps cristatus ?.....May 2nd, ... 5. P. O. 2.35 / 1.51 Pure white; when recently laid pale green. Wala lake. Nest, a heap of weeds floating on the surface of the water, but connected to reeds, &c.

3 Podiceps Philippensis, ...May 2nd, ... 5. P. O. Pure white. Wala lake.
1.40
1.00
Nest as No. 2.

4 Fulica atra,.....May 2nd, ... 8. L. O. P.....Pale brownish gray, dotted with reddish black. Wala lake.
2.10
1.40
Nest, pieces of dried reeds about 6 inches long, piled together among reeds and floating on the water.

5 Gallinula chloropus, ...May 2nd, ...O. P. Pale gray or reddish gray dotted and spotted with deep reddish brown.
1.70 1.57
1.26 1.11
Nest, a few weeds heaped on the water among reeds.

On the Peculiarities of the Gáthá Dialect.—*By Bábu* Rájendralál Mittra.

It is an established truth in the science of Philology that languages change in course of time, even when uninfluenced by the intrusion of foreign elements. This process of mutation is most clearly exemplified in the transition of the Latin into the modern dialects of Italy, which have assumed their present forms by a series of phonetic changes from the influence of the *genius loci* without any such heterogeneous admixture as are met with in the languages of England and France. In India, the Sanskrita has undergone the same course of transformation, and like the Latin has produced a number of Prakrita or vernacular dialects by a process of curtailment of inflexion and euphony to which the Romance and Germanic languages of Europe offer the nearest parallel.

Of the dialects which have proceeded from the Sanskrita, the Páli and the Mágadhi have hitherto been supposed to bear the closest resemblance to their parent, but the discovery of the Sanskrita Buddhist literature of Nepal (thanks to the untiring zeal of the learned Mr. Hodgson) has brought to our knowledge a new dialect bearing a still closer affinity to the classic language of the East, than either of the former. Nepalese chroniclers have named it Gáthá, (ballad) probably, from its having been principally used by the scalds and bards of mediæval India. For nearly a similar reason the Balenese style the language of their poets, the *Káwi* or poetical, and the language of the Vedas is called *Chhandas* (metrical), whence by a well-known euphonic law, we have the *Zend* of the old Persians.

M. Burnouf, the only European scholar who has noticed the existence of this dialect, describes it to be "a barbarous Sanskrita in which the forms of all ages, Sanskrita, Páli and Prákrita appear to be confounded."* It differs from the Sanskrita more in its neglect of the grammatical rules of the latter than from any inherent peculiarity of its own. The niceties of the Sanskrita forms of declension and conjugation find but a very in-

* l'Histoire du Buddhisme, p. 104.

different attention from the Gáthá versifier; he uses or rejects the usual case-affixes according to the exigencies of his metre with as much veneration for the rules of Pánini as the West Indian Negro has for those of Lindley Murray; indeed, the best illustration that can be given of the relation which exists between the Sanskrita, the Gáthá and the Páli, would be extracts from the literature of the Negroes. The following paragraph from a Negro version of the New Testament by some Moravian Missionaries* bears exactly the same relation to the English of the *Times* newspaper as the Páli does to the Sanskrita of the Puráṇas, and the affinity of its translation to the same standard, may be very appropriately likened to that of the Gáthá to the bráhmanic language of the gods.

"Drie deh na bakka, dem holi wan bruiloft na Cana na Galilee, en mamma va Jesus been ee dapeh. 2, Ma dem ben kali Jesus nanga him disciple toe va kom na da bruiloft. 3, En tah evieni kaba, mamma va Jesus takki na him, dem no habi wieni morro. 4, Jesus takki na him nu mamma noe worko me habi nanga joe. Tem va mi noben kom jette."

Translation.—"Three days after back, them hold one marriage in Cana of Galilee, and mamma of Jesus been there. 2. But them been call Jesus with him disciples to come to that marriage. 3. And when wine end, mamma of Jesus talk to him: Them no have wine more. 4. Jesus talk to him me mamma how work me have with you, time of me no come yet."

The Gáthá exists only in a versified form, and is to be met with in that class of Buddhist writings called the *Mahávaipulya* or the "highly developed" sutras. It occurs generally at the end and often in the middle, but never at the commencement, of a chapter, and contains a poetical abstract of the subject described in the prose portion of the works. The latter is written in pure Sanskrita, and comprises a highly amplified version of the subject matter, and often adverts to circumstances unnoticed in the former. In its extreme verbosity, the prose bears a strong resemblance to the Tantras, a class of works which was introduced into India between the 4th and the 7th centuries of the Christian era, and appears to be the production of men who undertook to write voluminous works with insufficient materials.

* Apud Quarterly Review, No 76.

The Gáthá is written in a variety of metres from the facile octosyllabic *anushtup*, to the most complicated *Sárdulavikridita*, which includes 19 syllables to the foot, and is remarkable for the simplicity of its style, and the easy natural flow of its language. Its peculiarities are those of a language in a state of transition; it professes to be Sanskrit, and yet does not conform to its rules. In it we find the old forms of the Sanskrita grammar gradually losing their expressive power, and prepositions and periphrastic expressions supplying their places, and time-hallowed verbs and conjugations juxtaposed to vulgar slangs and uncouth provincialisms. At one place, orthography is sacrificed for the sake of prosody and a word of a single short syllable is inflated into one of three syllables, while at another the latter yields to the former and a molossus supplies the place of a pyrrhic or a tribrach. A spirit of economy pervades the whole, and syllables and words are retrenched and modified with an unsparing hand. In the Lalita Vistara, a work of the highly developed class, instances of these peculiarities occur in great profusion, and they may be generally referred to (A) exigencies of metre, (B) provincialisms, and (C) errors of syntax and prosody.

A. Of the changes which may be attributed to the exigencies of metre, prolongation, contraction and elision of vowels, elision of consonants, and the segregation of compound consonants and long vowels into their simple elements, appear to be the most frequent. We shall quote a few instances:

1st. Of the prolongation of vowels the following may be taken as examples. They are not so frequently met with, as contractions.

ना च for न च p. 260.*
सो च for स च p. 292.
प्रयातो for प्रायातः p. 288.
रोदमान for रुदमान p. 288.
ते for ताः p. 293.

2nd. Of contractions of vowels, instances occur almost in every s'loka. They are generally effected by the use of short for long vowels, and the substitution of i and u for é, ai, o and au. For example:

* These instances are quoted from the edition of the Lalita Vistara now in course of publication in the Bibliotheca Indica.

यामि for यामे p. 291.
धरेन्ति for धारयन्ति p. 89.
द्रुमवर for द्रुमवराः p. 89.
माय for माया p. 91.
घण्ट for घण्टा p. 92.
पुजमेतां for पूजामेतां p. 93.
यथ for यथा
तथ for तथा
सद् for सदा

3rd. Elisions of vowels and consonants are also very frequent; they are effected principally with a view to economy and euphony. Final *ses* are invariably elided. Take for instance:

नभे for नभसि
अप्सराः for अप्सरसः p. 293.
सदार्चिस्कन्धि for सदार्चिषि स्कन्धे p. 201.
द्रम दृष्ट वस्थां for द्रमां दृष्ट्वा अवस्थां p. 229.
निश्वरो for निश्चार p. 220.
प्रणिधेन्ति for प्रणिध्यायन्ति p. 93.
मना for मनसः
एन for एतेन p. 293.

4th. Of the division of long vowels and compound consonants into their short and simple elements, the following are instances of constant occurrence:

रात्रिये for रात्र्याः or रात्र्याम् p. 291.
तुरियेभि for तुर्य्येभ्यः p. 220.
गिलानो for ग्लानो p. 228.
इस्त्रि for स्त्री p. 291.
तुरिय for तूर्य्य p. 288.
अकिलान्तका for अक्लान्तक p. 460.

This tendency to segregation of aspirated consonants, forms a principal characteristic of mediæval and modern Indian phonology. The Páli and the Prákrita owe their origin entirely to this cause. The Hindi and the Marhatti indulge in it to a large extent, and the Bengáli is not exempt from its influence. The process, however, of effecting this change is not uniform. In languages with a strong vocalic tendency, the sharpness of compound consonants is filed off by the elision of the first letter and the reduplication of the

second. Thus *abja* (lotus) is converted to *ajja; karma* (work) *to kamma*. In compounds of a liquid and an aspirated letter, the former is invariably elided without reference to its position, and accordingly "*padma*" [lotus] is changed to *padda*, "*sadma*" [house] into *sadda*, and *haridrá* [turmeric] into *haliddá*. The Italian, which is by far the most vocalic of all European languages, has this tendency in a prominent degree. In it, the Latin *subjunctivus* passes *into saggiuntivo*, *perfectio* into *perfetto*, *absorbeo* into *assorbire*, &c. &c. In languages which abound in consonantal finals, compound consonants are segregated by the interposition of a vowel between them, the final vowel being occasionally elided; thus in the Hindi, the Sanskrita word "marma" [a joint] is, by the interposition of an *a* after the *r* and the elision of the final *a*, converted into *maram; dharam*, *karam* and *parab* are instances of the effect of the same rules. These rules, however, are not universal in their application, and exceptions are very frequent.

B. The provincialisms of the Gáthá include (*α*) neglect of gender, number and case, (*β*) abbreviations and omissions of declensions, (*γ*) corruption of pronouns, and (*δ*) new forms of conjugation.

α—Of the neglect of gender, number and case, the following may be taken as examples:

विशुद्धनिर्म्मलं for विशुद्धनिर्म्मलान् p. 292 (singular for plural).
बुद्धचेवं for बुद्धचेवाणि p. 292 (ditto).
तानपि for तावपि p. 291 (plural for dual).
आसनिना for आसनात् p. 177 (instrumental for ablative).
बोधिसुवट for बोधिसुवटात् p. 462 (objective for ablative).
ऊर्द्ध हस्ता for ऊर्द्धौ हस्तौ p. 324 (plural for dual).
केचिदेकपादे for केचिदेकपादेन p. 324 (locative for instrumental).
चिलोकं for चिलोकी p. 316 (neuter for feminine).
कारणां for कारणानि p. 325 (singular feminine for plural neuter).
नचचाः for नचचाणि p. 236 (masculine for neuter).
मुक्तहारं for मुक्ताहारः p. 237 (dative for nominative).
मचकं for मचकः p. 237 (ditto).

β—Under the head of abbreviations and omissions of declension, the most remarkable peculiarity appears to be the use of उ in the room of all flectional affixes. This helps in a great measure to give sweetness and variety to the style, but at the same time it contributes to render the meaning dubious, and the study of the Gáthá

a matter of great difficulty to those who have nothing but their knowledge of the Sanskrita grammar to help them. In the Páli and the Prákrita, the use of this occasional substitute is confined to the first person of the nominative singular. In the Braja Bhákhá, however, it has a much wider range. In the following verse, it is used both for the nominative and the dative, as well as an euphonic adjunct to verbs in the second person of the indicative:

मो ते कहा मसकरी करऊ ।
कुवचन बोले तुमहि मरऊ ।
पीपाके मन उपजे रोसु ।
भलो कहत कत लावे दोसु । (De Tassy's Chrestomathie Hindie, p. 79.)

The use of the *u* in the Gáthá, is made with much reserve and the regular inflections of the Sanskrit prevail. The locative *i* (इ) is not subject, as in the Sanskrita, to any change of form by association with a vowel. In the vocative a long *á* (आ) is the most approved case-affix. In some cases, however, inflections are altogether dropped.

γ—The following are the corruptions of pronouns that are frequently met with in the Lalita Vistara. They apparently lead the way to the formation of pronouns in the modern vernaculars.

मह्य for मम and मत्तः
तुभ्य for त्वय, त्वां, and तव
अयु for एषः
ते for त्वा
कहिं for कुत्र and केन

δ—The new forms of conjugation observable in the Gáthá are attributable exclusively to corrupt pronunciation; they follow no fixed rule, and are the result of that natural tendency to abbreviation which in English originates "wont" from "will not" and "shant" from "shall not." The following are a few examples:

याति for गच्छति
ददमि for ददामि
विवरो for न्यग्रोधात्
निष्क्रमन्ति for निष्क्रामति
भोसि for भवसि
भोति for भवति
भोन्ति for भवन्ति
मुञ्चि for अमुञ्चन्

अजनेहि for माजनय
रमिष्यसि for रंस्यसे
आरुहि for अरोहत्
अरणो or रणो for अरणत्
उत्ति for उत्तिष्ठ
शृणुवन्तो for शृण्वन्ति
दद् for ददत्
शृणोहि for शृणु
प्रहेमि for पश्यामि
मुञ्चमो for अमुञ्च
भेष्यि for भविष्यामि-व-म-ति तः अन्ति-सि थ-ःथ
परिकथ for परिकथय
न्यसी for निदधुः
शृणित्वा for श्रुत्वा
ओरुहित्वा for अवरुह्य
शपयिसु for शापयामासुः
जहित्वा for हित्वा
बुद्धित्व for बुद्ध्वा

It may be remarked that the corruptions above quoted are, in many instances, the precursors of forms adopted in other affiliated dialects. In Sanskrita the third person singular of the verb *to be* is *Bhavati*, which in the Gáthá changes to *Bhoti* by the conversion of the *v* into *o* and the elision of the *a* before and after it, *(Bhonti* in the plural and *Bhosi* in the second person singular) and thence we have *hoti*, *hosi* and *honti* in the Mágadhi; *Hae* and *Haen* in the Khariboli, and *áhe*, *ahet* and *ahes* in the Marhatti. In the Hindi, notwithstanding the reduplication of the root in *hotáhae*, the original form is still distinctly indicated. *S'unitvá* for *s'rutvá* is the first step to the formation of *s'uniá* in Bengali, while *s'unohi* passes into *s'uno* with nothing but the elision of an inflexion, which in the original Sanskrita, is oftener omitted than retained.

C. In the collocation of words and phrases the Gáthá strictly follows the rules of Sanskrita Syntax, but in the formation of compound terms it admits of many licenses highly offensive to the canons of Pánini and Vopa deva. They seem, however, to be the consequence of haste and inattention, and are not referible to any dialectic peculiarity. The same may be said of the errors of Prosody which, notwithstanding the anxiety of the Gáthá versifier

to avoid false metre even at the expense of etimology, prevail to a great extent in their compositions. In this respect the Gáthá may be likened to the Kabits of the Bháts of modern India, who in their attempt to combine freedom of elocution, harmony and grammar in their improvisiations—sadly offends against all three.

Of the origin of the Gáthá, nothing appears to be known for certain M. Burnouf is inclined to attribute it to ignorance ; he says :—

"This fact (the difference of language of the different parts of the Vaipulya S'utras) indicates in the clearest manner that there was another digest (of the Buddhist literature prepared, besides those of the three convocations) and it agrees with the development of the poetical pieces in which these impurities occur, in shewing that those pieces do not proceed from the same hand to which the simple Sutras owe their origin. There is nothing in the books characterised by this difference of language, which throws the smallest light on its origin. Are we to look on this as the use of a popular style which may have developed itself subsequent to the preaching of Sákya, and which would thus be intermediate between the regular Sanskrita and the Páli,—a dialect entirely derived and manifestly posterior to the Sanskrita ? or should we rather regard it as the crude composition of writers to whom the Sanskrita was no longer familiar, and who endeavoured to write in the learned language, they ill understood, with the freedom which is imparted by the habitual use of a popular but imperfectly determined dialect ? It will be for history to decide which of these two solutions is correct; to my mind the second appears to be the more probable one, but direct evidence being wanting, we are reduced to the inductions furnished by the very few facts as yet known. Now, these facts are not all to be found in the Nepalese collection ; it is indispensably necessary in order to understand the question in all its bearings to consult for an instant the Singalese collection and the traditions of the Buddhists of the South. What we thence learn is, that the sacred texts are there written in Páli ; that is to say in a dialect derived immediately from the learned idiom of the Bráhmans, and which differs very little from the dialect which is found on the most ancient Buddhist monuments in India. Is it in this dialect that the poetical portions of the great Sutras are composed ? By no means ; the style of these portions is an indescribable

melange in which incorrect Sanskrit bristles with forms of which some are entirely Páli and others popular in the most general sense of the term. There is no geographical name to bestow upon a language of this kind; but it is at the same time intelligible how such a jargon may have been produced in places where the Sanskrita was not studied systematically, and in the midst of populations which had never spoken it or had known only the dialects derived from branches more or less remote from the primitive stock. I incline then to the belief that this part of the great Sutras must have been written out of India, or, to express myself more precisely, in countries situated on this (western) side of the Indus, or in Cashmir, for example; countries where the learned language of Bráhmanism and Buddhism would be cultivated with less success than in Central India. It appears to me almost impossible that the jargon of these poems, could have been produced in an epoch when Buddhism flourished in Hindustán. There, in fact, the priests had no other choice but between these two idioms; either the Sanskrita, i. e. the language which prevails in the compositions collected in Nepal, or the Páli, that is the dialect which is found on the ancient Buddhist inscriptions of India, and which has been adopted by the Buddhists of Ceylon."*

This opinion, we venture to think, is founded on a mistaken estimate of Sanskrita style. The poetry of the Gáthá has much artistic elegance which at once indicates that it is not the composition of men, who were ignorant of the first principles of grammar. Its authors display a great deal of learning, and discuss the subtlest questions of logic and metaphysics with much tact and ability, and it is difficult to conceive that men who were perfectly familiar with the most intricate forms of Sanskrita logic; who have expressed the most abstruse metaphysical ideas in precise and often in beautiful language; who composed with ease and elegance in *Arya*, *Toṭaka* and other difficult measures, were unacquainted with the rudiments of the language in which they wrote, and even unable to conjugate the verb to be, in all its forms. This difficulty is greatly enhanced, when we bear in mind that the prose portion of the Vaipulya Sutras is written in perfectly pure Sanskrita, and has no trace whatever of the provincialisms and popular forms so abundant in the poetry. If these

* *l'Histoire du Buddhisme Indien*, p. 105.

Sutras be the productions of men beyond the Indus imperfectly acquainted with the Sanskrita, how happens one portion of them to be so perfect in every respect, while the other is so impure? What could have been the object of writing the same subject twice over in the same work, once in pure prose and then in incorrect poetry?

It might be supposed—what is most likely the case—that the prose and the poetry are the productions of two different ages; but the question would then arise, how came they to be associated together? What could have induced the authors of the prose portions to insert in their works, the incorrect productions of Trans-Indus origin? Nothing but a sense of the truthfulness and authenticity of those narratives, could have led to their adoption. But how is it likely to be supposed that the most authentic account of S'ákya within three hundred years after his death, was to be had only in countries hundreds of miles away from the place of his birth, and the field of his preachings? The great Sutras are supposed to have been compiled about the time of the third convocation, (309 B. C.) when it is not at all likely that the sages of Central India would have gone to Cashmere in search of data, which could be best gathered at their own threshold.

The more reasonable conjecture appears to be that the Gáthá is the production of bards, who were contemporaries or immediate successors of S'ákya, who recounted to the devout congregations of the prophet of Magadha, the sayings and doings of their great teacher, in popular and easy flowing verses, which in course of time came to be regarded as the most authentic source of all information connected with the founder of Buddhism. The high estimation in which the ballads and improvisiations of bards are held in India and particularly in the Buddhist writings, favours this supposition; and the circumstance that the poetical portions are generally introduced in corroboration of the narrative of the prose, with the words: तत्रेदमुच्यते, "Thereof this may be said," affords a strong presumptive evidence.

According to the *Mahawanso*, the Buddhist scriptures were chaunted chapter after chapter as they were compiled by the Theros of the first convocation. This could scarcely have been possible had not the Sutras been in verse, and that they were in verse and in

the Gáthá form too, we learn in another part of the same work (Chap. 37th).*

The Hon'ble Mr. Turnour is of opinion that the religion of S'ákya was originally "preached and spread among the people" in the Páli language, and yet in his edition of the Maháwanso he has shewn that Mahindo son of Asoka translated the Buddhist scriptures into Cingalese from the digest prepared at the convocation held in the 27th year of his father's reign, and that from that recension the Páli version was got up in the middle of the fifth century (459 @ 477 A. C.) admitting thereby that the language used at the third convocation was other than Páli, for if Asoka's edition had been in that language a new edition from the Cingalese recension would have been quite uncalled for, if not useless. As a collateral evidence it may be noticed that the history of S'ákya as recorded in the Burmese "Malalengara Wottoo"† which is a faithful translation of the Pali Lalita Vistará, bears a closer approximation to the narrative of the Gáthá than to that of the prose of the great Sutras, shewing the former to be a more authentic, at least a more generally received, version than the latter.

The language of the Gáthá is believed, by M. Burnouf, to be intermediate between the Páli and the pure Sanskrita. Now, as the Páli was the vernacular language of India from Cuttack to Kapurdagiri within three hundred years after the death of S'ákya, it would not be unreasonable to suppose that the Gáthá which preceded it was the dialect of the million at the time of S'ákya's advent. If our conjecture in this respect be right it would follow that the Sanskrita passed into the Gáthá six hundred years before the Christian era; that three hundred years subsequently it changed into the Páli and that thence in two hundred years more, preceded the Prákrita and its sister dialects the Sauraseni, the Drávidi and the Pañcháli, which in their turn formed the present vernacular dialects of India.

* When Buddhoghoso offered to undertake the translation of the Cingalese version of the Pitakattayan into Páli, the priesthood of the Mahávihara at Anurádhápuro "for the purpose of testing his qualifications, gave him only two GA'THA'S, saying; hence prove thy qualification; having satisfied ourselves on this point, we will then let thee have all the books." Ante Vol. VI. p. 508.

† For a translation of this work vide Journal American Oriental Society, Vol. III. p. 1 et seq.

PROCEEDINGS

OF THE

ASIATIC SOCIETY OF BENGAL,

For September, 1854.

At an ordinary general meeting of the Society held on the 6th instant, at half-past 8 P. M.

The Hon'ble Sir J. W. Colvile, Kt. President, in the chair.

The proceedings of the last month were read and confirmed, and the accounts and vouchers for the months of June and July laid on the table.

Presentations were received—

1. From the Government of Bengal through Mr. Under-Secretary Young, for the use of the Museum of Economic Geology, Maps of South Behar, Hooghly and Bhaugulpore.

2. From Capt. Thuillier, maps of the same districts for the use of the Library of the Society.

3. From J. P. Collier, Esq., two copies of a work on the Languages of the Seat of War, by Dr. Max Müller.

4. From Mr. W. Theobald, seventeen Indo-Scythian copper coins.

5. From R. M. Stephenson, Esq. through Lieut.-Col. Baker, Specimens of Iron Ore from Midnapore and of Sulphate of Iron from Assam. Of the latter Mr. Wagentrieber writes: "The quantity now sent cannot be taken as a criterion of what it would actually cost if collected in larger quantities, and regularly, but the expense attending the six maunds and twenty-three seers was Rs. 17, *on board* the Flat or at the rate of Rs. 2-9-4; it could however be delivered on the banks of the Berhampooter at a much lower rate than that."

6. From the Society of Antiquaries, through J. Akermann, Esq. Secretary, Archæologia Vol. XXXV. p. 2, and Proceedings Nos. 37—40.

R. Spaukie, Esq., C. S. duly proposed and seconded at the last meeting, was balloted for and elected an ordinary member.

W. Muir, Esq. C. S. was named for ballot at the next meeting; proposed by the Hon'ble J. R. Colvin and seconded by the President.

Communications were received—

1. From Dr. E. Balfour, in charge of the Government Central Museum at Madras, forwarding a memorandum regarding the forests and woods of Southern India, prepared with a view to procuring information from the various districts, for a report to be made to the Madras Government on the 31st December, 1854.

2. From the Assistant Secretary to the Government, N. W. Provinces, enclosing copy of a Meteorological Register kept at the Secretariat office at Agra for the month of July last.

3. From Bábu Rádhánáth Sikdár, enclosing an Abstract of the results of the hourly Meteorological Observations taken at the Surveyor General's Office, in the month of May, 1854.

4. From Capt. E. T. Dalton, submitting a paper entitled "Notes on Assam Temple Ruins."

5. From the same, enclosing facsimiles and engravings of silver coins found at Gowhatty. The coins are of Shumsoodeen, Ilyas, Sekunder Shah, Gyasoodeen, Azim Shah and Mohamed Shah of the early Patan Dynasty. "They were found" says Capt. D. "full fifteen feet below the surface. The fortunate discoverer picked up a great many more than he made over to me, but it is rather curious that there should be such a variety in so small a collection."

6. From Prof. F. E. Hall, Benares, a paper entitled "a Passage in the life of Válmiki."

7. From W. Muir, Esq., Secretary to the N. W. Government, announcing that the Lieut.-Governor had sanctioned an expenditure of Rs. 500 for prosecuting the excavations of Sárnáth.

The Librarian and the Curator of the Zoological department submitted their usual monthly reports.

After the close of the regular business of the evening, Mr. Oldham briefly described the geological structure of the Sub-Himalayan hills, south of Darjiling; of the Khasia hills; and of the Rajmahal hills.

South of Darjiling, forming the lower portion of the great range of the outer Himalayah, occurs a group of sandstones, hard greenish coloured clunchy clays, and a few beds of shales, or laminated clays, forming together one continuous formation, attaining a stratigraphical thickness of upwards of 4000 feet. These all dip at high angles (40° to 70°) towards the north and north by west; or towards the hills. Their actual junction with the great mass of the gneissose, micaceous and quartzose metamorphic rock of which the higher masses of the hills are composed, was not traced in the neighbourhood of the Teesta; but their connection can be seen more to the west, where these sandstones are brought into contact with the metamorphic rocks by a great fault which bears nearly east and west.

In these sandstones, occur many imbedded stems of trees often of large size, frequently much worn and deprived of their bark and branches, but occasionally with the bark perfectly preserved and mineralized into a brilliant jet; the mass or central part of the stem being replaced by siliceous matter. In the bed of shales associated with the sandstones, occur numerous leaves of dicotyledonous trees, in all cases detached, and often much worm-eaten and decayed, but in general aspect of a very recent or modern character. Near the river Teesta, I did not find myself any remains of animals, nor did I hear on enquiry from the natives that such had ever been found. Dr. J. Hooker in his most interesting Journals mentions that he found in the continuation of these same rocks, a little further to the westward, what he thought was the shaft of a bone, and also some very imperfect vegetable remains, which he referred to *Vertebraria*. The correctness of the latter reference, I am inclined to doubt. After a careful search, I could myself find nothing of the kind, although numerous vegetable remains were met with; and I am tolerably certain that no trace of this remarkable genus Vertebraria is to be met with there.

These rocks extend into Bhotan on the east, and stretch away to the west also, but their limits in either direction are unknown. So far as they have been traced, they maintain the same general direction and dip.

The whole thickness of these rocks (more than 400 feet) consists of perfectly conformable beds, following in regular sequence, and containing identically similar plants in the uppermost as well as in the lowest beds of the group. They constitute therefore one great formation, the upper inferior limits of which are in this district unseen; and which from the mineral character of the rocks, from the imbedded remains of plants, and from their general aspect and arrangement, I would refer to the same epoch, as the great Sewalik group of the N. W. Provinces.

Of these sandstones, several small detached patches occur far within the hills, as in the valley of the Rungeet near Oushok, &c. &c., a fact of great

interest in the history of the formation of these hills. Dr. Hooker was not fortunate enough to have met with any of these, and speculates on the absence of any traces of these rocks.

Associated with this group of rocks, occur the deposits of coal which have been stated to occur in this district. There does not, however, appear to be a sound prospect of the discovery of any seam or bed of coal, sufficient in quantity to form a useful source of supply. In the Sewalik hills to the north-west, beds of lignite and of coal have also been found; but all the analogies of the rocks are against the supposition that such small beds will prove continuous, or large.

Passing now to the Khasia hills, the geological structure is very different. These hills rise from the great flat of the plains almost like a perpendicular wall of rocks, of which the greater portion is composed of sandstones of various tints, often calcareous and ferruginous, all associated with nummulitic limestones. The geological age of these rocks is well marked by this latter deposit, above and immediately in connection with which, occurs the coal of Cherra Poonji. There are no well marked traces of the newer rocks, above the nummulitic group, at Cherra Poonji, while this group rests immediately upon the micaceous, and gneissose metamorphic rocks below. All the known beds of coal in this district, occur in this series of rocks, which must be referred to the older tertiary epoch.

Passing now to the Rajmahal hills we find there resting distinctly and without any other intervening beds, on the metamorphic gneiss and schists of the plains of Bengal, a series of sandstones and shales with coal of a very different character from either of the group above alluded to. The connection of these beds with the great coal-yielding group of Ranigunj, and of the Burdwan coal field is perfectly established not only by the similarity of mineral character and of imbedded fossils, but also by the occurrence, at intervals within the intervening space, of patches of the same rocks, now detached and left as monuments of the vast denudation that has taken place, and of the original continuity of the rocks.

In the Damoodah coal-field it is well known that these rocks are cut up by numerous trappean dykes, but in the Rajmahal hills, the exhibition of volcanic forces has been on an infinitely larger scale. There we find great sheets of lava poured out over these sandstone shales: and this flow of igneous matter again covered up by other mechanically deposited beds, containing fossil remains similar to those in the beds beneath: And this is repeated several times. In all these cases, the uppermost beds of the mechanical rocks have been greatly altered, indurated and baked by the contact of the great mass of molten matter above: while on the several flows of the trappean character, the bedded rocks rests quite unchanged, and in several

instances the lower beds are partially made up of the disintegrated particles of the trap itself, mechanically re-arranged. The evidence is quite conclusive that there have been successive flows of matter in a state of fusion, during a long continued period, during the intervals of which mechanical deposits of sand and mud, often highly charged with vegetable remains took place.

These remains of plants are often remarkably well preserved, and occur so associated, that we must consider the whole series of beds, notwithstanding its interruption by the intercalation of the great masses of foreign matter, as forming one group or formation belonging, generally, to the same geological epoch as the coal-bearing rocks of the Ranigunj district.

The true age of these rocks is one of the most interesting questions of Indian Geology; and anything tending to throw light on it, is of great geological interest. Unfortunately in the Bengal coal-field no animal remains have as yet been found to aid in its solution. And no true or well defined horizon or datum line has been established from which the position of these rocks in the general series can be ascertained. I have already, in a previous number of this Journal, expressed my own opinion on this question; but it may be as well to point out the state of the case more fully.

In the coal-fields of India, numerous remains of fossil plants are found referable to genera, which to European geologists are known only to occur in rocks of a more recent date than the true carboniferous epoch. Associated with these are other genera not hitherto found at all in European rocks, but occurring plentifully in this country, and also in Australia. Now it is well known to every geologist, that the remains of plants alone furnish exceedingly poor evidence on which to base any conclusions with regard to the age of the rocks in which they occur. And this being the case, it is important to find, if possible, fossils belonging to the animal kingdom in connexion with them. Now in Australia, associated with beds containing fossil plants specifically identical with those found in the Indian coal-fields, occur other beds rich in animal remains, of a well marked type, which type represents a period (geological) corresponding to the lower carboniferous group of Europe. It was at first supposed that the beds containing the fossil plants occurred above, and formed a distinct group from the shelly beds; but the observation of all the most trustworthy witnesses negatives this. And in Australia, so far as our present evidence goes, it must, I think be conceded, that the same fossil plants, which in India characterize the coal-yielding beds, occur associated with abundant remains of shells, which must be considered of the carboniferous epoch of European geology. But the question is by no means so easily solved: for passing into Western India, we find associated with identically the same plants, as occur with those

found in the coal-yielding beds of Bengal, numerous remains of shells, &c. which are undoubtedly representatives of the oolitic period (Ammonites, &c.) The evidence here also would seem clear and the statements of Captain Grant in his description of Cutch, would lead us to refer the coal-yielding beds of that district containing Ptilophylla, &c. to the *oolitic* group. Taking therefore, the analogy of the nearer country, and coupling this with the general analogy, of the fossil plants found in these beds, I am disposed to think that we must *provisionally* consider these coal-bearing rocks of Bengal, as belonging rather to the mesozoic period, than to the palæozoic.

I have stated the difficulties of this question more fully, than may appear needful, because in some recent papers on the geology of India, it has been assumed as perfectly settled and acknowledged; and the whole of the coal-yielding rocks of the country have been unhesitatingly referred to the oolitic epoch, a conclusion by no means established.

The fossils obtained from these beds in the Rajmahal hills are numerous and beautifully preserved; and if not sufficient to decide their geological age will at least add much to our knowledge of the flora of the time.

We have thus traced the occurrence of beds or seams of coal in three distinct districts in Bengal in three formations of very distinct ages, but all of which have hitherto been referred to the same epoch; in the newer tertiary (miocene?) of the Sikim Sub-himalaya; in the older tertiary (eocene) of the Khasia hills; and in the secondary (probably oolitic, possibly carboniferous) rocks of the Rajmahal hills.

While endeavouring to avoid any detail, Mr. Oldham had to apologize for having so far trespassed on the time of the Society, being quite unprepared with diagrams or maps to illustrate his statements. Having come to Calcutta on other business, he had been requested by their Secretary to give a brief outline of the results of the examination of the districts he had visited, and for these results they were indebted to the zealous and untiring labours of his colleagues as much as to himself, labours carried on under difficulties which few geologists can fully appreciate.

Library.

The following additions have been made to the Library since the date of the last report.

Presented.

Archæologia, Vol. XXXV. p. 2.—By the Society of Antiquaries.

Proceedings of the Society of Antiquaries of London, Nos. 37 to 40.—By the Same.

List of Members of ditto.—By the Same.

Des Vedas par M. J. Bartholemy Saint Helaire, Paris, 1854, 8vo.—By the Author.

Report on the Revenue Administration of the Tenasserim Provinces for 1851-52.—By the Government of Bengal.

Report on the Revenue Administration of the Province of Arracan for 1851-52.—By the Same.

Selections from the Public Correspondence of the Punjab Administration, No. VIII.—By the Chief Commissioner of Lahore.

Proceedings of the Royal Society of London, No. 4.—By the Society.

The Quarterly Journal of the Geological Society, No. 38.—By the Society.

The Oriental Christian Spectator for August, 1854.—By the Editor.

The Oriental Baptist, No. 93.—By the Editor.

The Calcutta Christian Observer for September.—By the Editors.

The Upadeshak, No. 93.

The Bibidhartha Sangraha, No. 29.—By the Editor.

Exchanged.

The Athenæum for June, 1854.

The Philosophical Magazine, Nos. 47 to 49.

Purchased.

Comptes Rendus, Nos. 18 to 24.

Journal des Savants for April and May, 1854.

The Annals and Magazine of Natural History, for July, 1854.

Vuller's Institutiones Linguæ Persicæ cum Sanscritâ et Zendicâ Linguæ comparatæ.

De Bode's Bokhárá.

Poper's Behmenjár ben el Marzuban der Persische Aristoteliker aus Avicenna's schule.

Ponseca's French Portuguese and Portuguese French Dictionary, Paris, 1853, 8vo. 2 vols.

Constancio's Portuguese Grammar, Paris, 1849, 12mo.

S'ivasánkirtana, 1854, 12mo.

Bhagavatí Gítá, 1853, 12mo.

Jnánárnava, 12mo.

Bhaktivartma Pradars'aka, 1853, 8vo.

Kabitáratnákara, 1830, 8vo.

Súkabilás, 1852, 8vo.

Bidagdha Mádhava, 1849, 8vo.

Házár masla, 8vo.

Káyasthadipiká, 1852, 8vo.

Krishna Lilámrita, 1848, 8vo.

Jaggannátha Mangala, 1848, 8vo.

Keyámat-námah, 8vo.
Vidyá Sundara, 1853, 8vo.
Sangita Taranga, 1849, 8vo.
Bhakta Mála, 1853, 8vo.

RA'JENDRALA'L MITTRA'.

6*th Sept.*, 1854.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1854.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
1	29.755	29.843	29.661	0.182	85.5	92.7	76.7	16.0
2	.847	.975	.742	.233	80.5	90.4	70.7	19.7
3	.883	.965	.780	.185	78.9	89.8	70.8	19.0
4	.847	.934	.769	.165	82.1	91.4	72.6	18.8
5	.800	.893	.674	.219	80.4	91.9	70.0	21.9
6	.801	.912	.727	.185	80.6	89.3	72.0	17.3
7	*Sunday.*							
8	.767	.838	.665	.173	83.2	93.9	75.7	18.2
9	.749	.833	.661	.172	82.6	91.8	75.2	16.6
10	.731	.792	.665	.127	84.9	93.3	76.8	16.5
11	.765	.834	.696	.138	86.9	95.6	80.4	15.2
12	.764	.839	.690	.149	88.0	98.6	81.4	17.2
13	.746	.815	.677	.138	87.2	94.3	81.4	12.9
14	*Sunday.*							
15	.784	.852	.688	.164	86.6	94.4	79 4	15.0
16	.767	.846	.708	.138	86.9	93.4	80.8	12.6
17	.789	.867	.703	.164	87.1	94.6	81.8	12.8
18	.807	.874	.717	.157	87.8	95.6	81.3	14.3
19	.759	.841	.652	.189	88.6	97.6	82.8	14.8
20	.703	.785	.609	.176	89.9	100.4	82.4	18.0
21	*Sunday.*							
22	.616	.699	.519	.180	90.2	100.0	82.4	17.6
23	.583	.664	.508	.156	89.8	99.6	82.2	17.4
24	.555	.631	.467	.164	89.5	99.6	82.9	16.7
25	.507	.589	.404	.185	90.3	100.7	82.0	18.7
26	.462	.523	.377	.146	91.0	101.9	82.7	19.2
27	.425	.473	.348	.125	91.2	99.8	83.8	16.0
28	*Sunday.*							
29	.466	.536	.395	.141	90.8	98.2	84.8	13.4
30	.499	.551	.441	.110	84.1	90.2	81.5	8.7
31	.506	.551	.452	.099	82.9	90.2	80.5	9.7

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1854.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	80.5	5.0	78.0	7.5	0.940	10.03	2.69	0.789
2	75.1	5.4	72.4	8.1	.785	8.46	2.52	.770
3	74.7	4.2	72.6	6.3	.790	8.56	1.91	.818
4	76.1	6.0	73.1	9.0	.803	8.63	2.88	.750
5	74.1	6.3	70,9	9.5	.748	8.07	2.87	.738
6	76.5	4.1	74.4	6.2	.838	9.04	1.97	.821
7	*Sunday.*							
8	78.8	4.4	76.6	6.6	.899	9.63	2.26	.810
9	78.5	4.1	76.4	6 2	.893	9.60	2,08	.822
10	81.4	3.5	79.6	5.3	.989	10.58	1.91	.847
11	81.5	5.4	78.8	8.1	.964	10.27	2.98	.775
12	82.4	5.6	79.6	8.4	.989	10.52	3.16	.769
13	82.7	4.5	80.4	6.8	1.014	10.79	2.58	.807
14	*Sunday.*							
15	79.9	6.7	76.5	10.1	0.896	9.56	3.58	.728
16	81.6	5.3	78.9	8.0	.967	10.30	2.95	.777
17	82.1	5.0	79.6	7.5	.989	10.52	2.81	.789
18	82.4	5.4	79.7	8.1	.992	10.55	3.05	.776
19	82 4	6.2	79 3	9 3	.979	10.40	3.52	.747
20	82.7	7.2	79.1	10.8	.973	10.30	4.16	.712
21	*Sunday.*							
22	81.4	8 8	77.0	13.2	.910	9.63	4.96	.660
23	81.7	8.1	77.6	12.2	.928	9.83	4.59	.682
24	82.4	7.1	78.8	10.7	.964	10.21	4.08	.714
25	82.8	7.5	79.0	11.3	.970	10.27	4.36	.702
26	84.0	7.0	80.5	10.5	1.017	10.74	4.19	.719
27	84.2	7.0	80.7	10.5	.024	10.80	4 22	.719
28	*Sunday.*							
29	84.6	6.2	81.5	9.3	.050	11.11	3.73	.749
30	81.1	3.0	79.6	4.5	0.989	10.58	1.63	.867
31	81.0	1.9	80.0	2.9	1.001	10.75	1.04	.912

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.699	29 903	29.442	0.461	81.2	87.2	71.6	15.6
1	.687	.876	.444	.432	81.0	86.8	71.2	15.6
2	.674	.874	.433	.441	80.6	86.6	71.2	15.4
3	.673	.858	.437	.421	80.3	86.6	70.9	15.7
4	.679	.863	.437	.426	80.2	85.4	70.8	14.6
5	.689	.877	.430	.447	79.9	84.8	71.3	13.5
6	.720	.911	.478	.433	80.2	84.8	71.5	13.3
7	.733	.931	.455	.476	81.4	86.6	71.5	15.1
8	.751	.957	.461	.496	84.2	89.0	73.8	15.2
9	.760	.965	.473	.492	87.1	91.3	77.2	14.1
10	.764	.975	.461	.514	89.5	94.0	80.1	13.9
11	.746	.947	.458	.489	91.2	96.9	82.4	14.5
Noon.	.730	.939	.453	.486	92.6	99.0	82.4	16.6
1	.705	.910	.426	.484	93.5	100.2	80.5	19.7
2	.675	.867	.403	.464	94.0	101.5	82.0	19.5
3	.652	.837	.381	.456	94.4	101.9	81.2	20.7
4	.621	.794	.357	.437	93.8	101.8	81.4	20.4
5	.613	.780	.348	.432	92.6	99 8	81.6	18.2
6	.622	.790	.352	.438	89 8	97.0	77.6	19.4
7	.641	.805	.372	.433	87.2	93.9	73.6	20.3
8	.675	.944	.423	.521	84.9	90.5	70.0	20.5
9	.702	.975	.427	.548	83.3	88.9	71.7	17.2
10	.708	.927	.438	.489	82.6	87.4	70.7	16.7
11	.706	.930	.447	.483	82.2	87.2	72.1	15.1

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Midnight.	78.4	2.8	77.0	4 2	0.910	9.81	1.40	0.875
1	78.3	2.7	76.9	4.1	.908	.78	.36	.878
2	78.1	2.5	76.8	3.8	.905	.75	.26	.886
3	78.1	2.2	77.0	3.3	.910	.83	.08	.901
4	78.2	2.0	77.2	3.0	.916	.89	0.99	.909
5	78.1	1.8	77.2	2.7	.916	.89	.89	.917
6	78.5	1.7	77 6	2.6	.928	10.01	.87	.920
7	79.1	2.3	77.9	3.5	.937	.08	1.19	.894
8	80.4	3.8	78.5	5.7	.955	.23	2 01	.836
9	81.5	5.6	78.7	8.4	.961	.24	3.09	.768
10	82.5	7.0	79 0	10.5	.970	.27	4.02	.719
11	83.0	8.2	78.9	12-3	.967	.22	.80	.680
Noon.	83.5	9.1	78.9	13.7	.967	.18	5.45	.651
1	83 4	10.1	78.3	15.2	.949	9.97	6 07	.622
2	83.6	10.4	78.4	15.6	.952	.98	.29	.613
3	82.9	11.5	77.1	17.3	.913	.58	.88	.582
4	83.1	10.7	77.7	16.1	.931	.78	.40	.604
5	82 7	9 9	77.7	14.9	.931	.80	5.83	.627
6	82.0	7.8	78.1	11.7	.943	.97	4.45	.691
7	80.9	6.3	77.7	9.5	.931	.90	3.47	.741
8	80.0	4.9	77 5	7.4	.925	.90	2.59	.793
9	79.6	3.7	77.7	5.6	.931	.98	1.95	.837
10	79.4	3.2	77.8	4.8	.934	10.03	.65	.859
11	79.2	3 0	77.7	4 5	.931	10.00	.54	.867

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of May, 1854.

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1	131.8	..	S. occasionally high.	Cloudy till 2 A. M. cloudy till 6 A. M. scattered \ni till 11 A. M. cloudy afterwards.
2	133.9	..	S. (sharp.) or S. E.	Cloudy the whole day with occasional lightning and thundering, also raining at 8 and 9 P. M.
3	124.0	0.66	N. E. or S. (stormy)	Cloudless till 8 A. M. cloudy afterwards with rain between 9 and 10 P. M.
4	125.2	..	S.	Scattered clouds of various kinds till 5 P. M. cloudless afterwards.
5	146.0	..	S. or S. E. or N. (high)	Overcast till 7 A. M. scattered \ni or ⌒i till 4 P. M. cloudy afterwards with rain and lightning at 7 and 8 P. M.
6	126.0	1.06	S. E. (sharp) or N.E. [or S.	Cloudless till 8 A. M. scattered \i or _i or ⌒i afterwards.
7	*Sunday.*			
8	146.0	..	S.	Cloudless till 7 A. M. scattered ⌒i till 5 P. M. overcast afterwards with rain and lightning at 8 P. M.
9	140.5	0.52	S.	Cloudless till 8 A. M. scattered ⌒i till 4 P. M. overcast afterwards with thunder, lightning and rain between 7 and 9 P.M.
10	145.0	0 57	S.	Cloudy the whole day, also drizzling at 10 P. M.
11	150.0	..	S. or W.	Overcast till 1 A. M. cloudless till 5 A. M. scattered \i and _i till 1 P. M. cloudless afterwards.
12	136.0	..	S.	Cloudy till 3 A. M. cloudless till 8 P. M. overcast afterwards.
13	149.4	..	S.	Cloudy till 1 A. M. cloudless till 8 P. M. cloudy afterwards.
14	*Sunday*			
15	141.0	..	E. or S.E. or. S.	Cloudy till 2 A. M. scattered _i till 1 P. M. cloudless till 5 P. M. scattered \i afterwards.
16	138.7	..	S. E. or S. or N. E.	Cloudy nearly the whole day, also drizzling at 11 A. M.
17	140.0	..	S.	Scattered \i or _i or \ i till 2 P. M. overcast afterwards.
18	131.0	..	S.	Cloudy till 8 A. M. cloudless afterwards.
19	139.0	..	S. E. or S.	Cloudless till 2 A. M. cloudy afterwards.
20	150.0	..	S.	Cloudless.

Date.	Max Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
21	*Sunday.*			
22	156.0	..	S.	Cloudless.
23	157.0	..	S.	Cloudless,
24	156.0	..	S.	Cloudless.
25	152.2	..	S. or S. E.	Cloudless.
26	158.0	..	S. or S. E.	Cloudless.
27	143.6	..	S. E. or E.	Cloudless till 10 A M. scattered \i till 3 P. M. cloudless afterwards.
28	*Sunday.*			
29	157.0	..	S. or E. or N. E.	Cloudless till 6 A. M. scattered \ i till noon, scattered ∩i till 6 P. M. cloudless till 9 P. M. clouds and lightning on W. horizon afterwards.
30		0.38	E. or S. E.	Cloudy till 1 A. M. cloudless till 5 A. M. cloudy afterwards, also raining at 11A.M
31	134.0	0.56	E. or N. E. or S.	Cloudy also raining between 11 A. M. and 7 P. M.

\i Cirri ∩i cumuli,—i strati, \ i cirro-cumuli \—i cirro-strati ∩-i cumulo-strati \—i nimbi,

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1854.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches	o	o	o	o
1	29.488	29.538	29.444	0.094	82.2	88.2	80.0	8.2
2	.450	.509	.387	.122	80.4	85.9	77.0	8.9
3	.457	.518	.411	.107	79.3	80.5	78.4	2.1
4	*Sunday.*							
5	.520	.587	.470	.117	82.6	89.4	75.0	14.4
6	.511	.582	.393	.189	84.3	90.6	79.0	11.6
7	.463	.530	.398	.132	88.4	94.8	83.2	11.6
8	.498	.565	.448	.117	87.4	91.4	84.6	6.8
9	.555	.640	.506	.134	87.4	95.2	81.2	14.0
10	.579	.633	.494	.139	86.1	93.6	80.0	13.6
11	*Sunday.*							
12	.430	.484	.377	.107	86.3	91.8	83.0	8.8
13	.412	.475	.350	.125	81.5	84.2	79.0	5.2
14	.472	.534	.424	.110	85.9	92.2	79.5	12.7
15	.530	.570	.480	.090	87.4	93.2	79.8	13.4
16	.546	.585	.483	.102	84.0	90.9	79.0	11.9
17	.546	.594	.491	.103	83.5	90.1	78.8	11.3
18	*Sunday.*							
19	.515	.556	.473	.083	82.0	85.0	80.0	5.0
20	.571	.640	.523	.117	81.0	83.2	78.2	5.0
21	.607	.661	.550	.111	83.8	88.7	80.5	8.2
22	.583	.624	.526	.098	85.8	90.6	80.4	10.2
23	.583	.638	.507	.131	85.7	90.6	83.0	7.6
24	.583	.618	.535	.083	84.6	86.8	81.8	5.0
25	*Sunday.*							
26	.609	.659	.525	.134	85.2	91.6	81.2	10.4
27	.619	.681	.573	.108	83.0	88.2	81.3	6.9
28	.711	.765	.669	.096	79.8	82.4	78.0	4.4
29	.711	.755	.640	.115	84.1	90.0	79.6	10.4
30	.658	.716	.579	.137	85.2	89.8	81.6	8.2

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1854.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed DewPoint.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saration being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	80.4	1.8	79.5	2.7	0.986	10.60	0.94	0.919
2	79.0	1.4	78.3	2.1	.949	10.24	0.70	.936
3	78.3	1.0	77.8	1 5	.934	10.09	0.50	.953
4	*Sunday.*							
5	80.4	2.2	79.3	3.3	.979	10.53	1.15	.902
6	82.0	2.3	80.8	3.5	1.027	10.98	1.30	.894
7	85.1	3.3	83.4	5.0	.114	11.84	2.00	.855
8	83.9	3.5	82.1	5.3	.069	11.39	2.06	.847
9	83.9	3.5	82.1	5.3	.069	11.39	2.06	.847
10	82.5	3.6	80.7	5.4	.024	10.93	2.02	.844
11	*Sunday.*							
12	82.8	3.5	81.0	5.3	.034	11.03	1.99	.847
13	80.0	1.5	79.2	2.3	0.976	10.52	0.79	.930
14	82.4	3.5	80.6	5.3	1.021	10.90	1.97	.847
15	83.6	3.8	81.7	5.7	.057	11.23	2.22	.835
16	81.2	2.8	79.8	4.2	0.995	10.66	1.51	.876
17	80.5	3.0	79.0	4.5	.970	10.40	1.60	.867
18	*Sunday.*							
19	80.2	1.8	79.3	2.7	.979	10.53	0.94	.918
20	79.4	1.6	78.6	2.4	.958	10.34	0.80	.928
21	81.6	2 2	80.5	3.3	1.017	10.91	1.19	.902
22	82.5	3.3	80.8	5.0	.027	10.96	1.87	.854
23	82.6	3.1	81.0	4.7	.034	11.03	1.77	.862
24	82.0	2.6	80.7	3.9	.024	10.95	1.44	.884
25	*Sunday.*							
26	82 2	3.0	80.7	4.5	.024	10.93	1.68	.867
27	80.9	2.1	79.8	3.2	0.995	10.69	1 13	.904
28	78.3	1.5	77.5	2.3	.925	10.00	0.75	.930
29	80.8	3.3	79.1	5.0	.973	10.42	1.79	.853
30	81.8	3.4	80.1	5.1	1.005	10.73	1.88	.851

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1854.

Hourly Means, &c., of the observations and of the hygrometrical elements dependent thereon, (*Continued.*)

Hour.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.561	29.741	29.428	0.313	81.9	86.6	75.0	11.6
1	.550	.753	.407	.346	81.8	86.4	75.0	11.4
2	.538	.743	.386	.357	81.8	85 7	75.2	10.5
3	.528	.734	.354	.380	81.5	85.4	76.4	9.0
4	.525	.732	.354	.378	81.5	85.4	78.2	7.2
5	.532	.721	.350	.371	81.4	85.4	78.2	7.2
6	.546	.743	.359	.384	81.4	85.0	78.3	6.7
7	.562	.751	.398	.353	82.1	85.6	78.4	7.2
8	.578	.755	.440	.315	83.4	87.4	78.6	8.8
9	.585	.760	.444	.316	84.7	90 0	79.6	10.4
10	.586	.765	.441	.324	85.9	91.6	79.3	12.3
11	.580	.758	.442	.316	87.0	93.1	79.8	13.3
Noon.	.569	.746	.448	.298	88.0	93.4	80.1	13.3
1	.553	.741	.423	.318	88.2	94.2	79 0	15.2
2	.531	.723	.409	.314	88.3	95.2	78.8	16.4
3	.510	.698	.387	.311	88.0	95.2	79.4	15 8
4	.494	.676	.374	.302	86.8	94.2	77.0	17.2
5	.495	.678	.361	.317	86.3	94.8	78.0	16.8
6	.504	.696	.373	.323	84.7	92.4	78.0	14.4
7	.523	.694	.391	.303	83.7	91.2	78.6	12.6
8	.542	.704	.399	.305	83.3	89.6	78.7	10.9
9	.564	.710	.418	.292	82.5	88.3	78.8	9.5
10	.579	.718	.442	.276	82.3	87.7	78.7	9.0
11	.579	.741	.443	.298	82.1	86.8	78.8	8.0

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of June, 1854.

Hourly Means, &c., of the observations and of the hygrometrical elements dependent thereon, *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Midnight.	80.3	1.6	79.5	2.4	0.986	10.62	0.82	0.928
1	80.3	1 5	79.5	2.3	.986	.62	.78	.932
2	80.3	1.5	79.5	2 3	.986	.62	.78	.932
3	80.2	1.3	79.5	2.0	.986	.62	.69	.939
4	80.2	1 3	79.5	2.0	.986	.62	.69	.939
5	80.1	1.3	79.4	2.0	.983	.58	.69	.939
6	80.2	1 2	79.6	1.8	.989	.65	.62	.945
7	80.7	1.4	80.0	2.1	1.001	.77	.74	.936
8	81.2	2.2	80.1	3.3	.005	.77	1.19	.901
9	81.8	2.9	80 3	4.4	.011	.82	.60	.871
10	82.6	3.3	80.9	5.0	.030	.99	.88	.854
11	83.0	4.0	81.0	6 0	.034	11.01	2.28	.828
Noon.	83.5	4.5	81.2	6.8	.040	.05	.63	.808
1	83.5	4.7	81.1	7.1	.037	.01	.75	.800
2	83.5	4.8	81.1	7.2	.037	.01	.79	.798
3	83.6	4.4	81.4	6.6	.047	.11	.57	.812
4	82.9	3.9	80.9	5.9	.030	10.97	.24	.830
5	82.4	3.9	80 4	5.9	.014	.81	.21	.830
6	81.5	3.2	79.9	4.8	0.998	.67	1.75	.859
7	81.0	2.7	79.6	4 1	.989	.60	.47	.878
8	80.9	2.4	79.7	3.6	.992	.63	.30	.891
9	80.6	1.9	79 6	2 9	.989	.63	.10	.913
10	80.5	1 8	79.6	2.7	.989	.63	0.95	.918
11	80.4	1.7	79 5	2.6	.986	.60	.91	.921

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the Month of June, 1854.

Solar radiation, Weather, &c.

Date.	Max. Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc		
1	..	..	N. E. or N.N.E. or S.W.	Cloudy and raining occasionally.
2	..	1.92	Calm or S. E. or S. W.	Ditto ditto ditto.
3	..	3.66	Calm or S. W. or W.	Cloudy and raining constantly.
4	*Sunday.*	3 32		
5	..	..	S. E. or E. or S. or N.	Cloudy and occasional rain with thunder and lightning.
6	..	0.36	S. or W.	Ditto ditto ditto.
7	142.0	0.16	Calm or S. or S. W.	Cloudy.
8	125.0	..	Calm or S. or S. E.	Overcast.
9	139.0	..	Calm or S. E. or S.	Cloudy and rain between 5 and 6 P. M.
10	137.0	0.65	S. E. or S.	Cloudy.
11	*Sunday.*	..		
12	121.0	.	S.	Overcast and Drizzling at 7 P. M.
13	..	2.13	N. W.	Overcast and raining occasionally.
14	139.0	..	S. or S. W. or W.	Overcast.
15	117.0	..	Calm or W. or S. W.	Cloudy with rain between 8 and 9 P. M.
16	133.0	0.12	S. E. or S.	Overcast and raining from 7 P. M. till midnight.
17	142.5	1.16	S.	Cloudy and Drizzling at 3 A. M. 9 and 10 P. M.
18	*Sunday*	..		
19	..	0.60	E. or S. E. or S.	Cloudy and raining or Drizzling constantly.
20	..	0.46	S. E.	Ditto ditto ditto.
21	..	..	S. E. or S. W. or S.S.E.	Cloudless till 2 A. M. overcast afterwards.
22	136.5	..	S. E. occasionally sharp.	Cloudy.
23	118.0	..	S. sharp or E.	Ditto.
24	..	..	S. E. sharp in the M.	Overcast and Drizzling at 2 A. M.
25	*Sunday.*	0.42	...	
26	147.0	..	S. or N. E. or S.	Cloudless till 5 A. M. afterwards cloudy with occasional Drizzling.
27	119.0	0.88	S. or calm or S. E.	Cloudy and raining between 3 P. M. and midnight.
28	..	0.78	S.	Cloudy and constantly raining or Drizzling.
29	148 0	0.20	S. E. or S.	Cloudy with little Drizzling.
30	138.0	..	S. E. or S.	Cloudless till 3 A. M. cloudy and little Drizzling at 10 P. M.

\i Cirri _ cirro-strati, ~i cumuli, ~_i cumulo-strati, _i nimbi, —i strati, \~ i cirro-cumuli.

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1854.

Latitude 22° 33′ 1″ North. Longitude 88° 20′ 34″ East.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon.

Date.	Mean Height of the Barometer at 32° Fahr.	Range of the Barometer during the day.			Mean Dry Bulb Thermometer.	Range of the Temperature during the day.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches	°	°	°	°
1	29.619	29.663	29.543	0.120	85.1	90.0	82.7	7.3
2	*Sunday.*							
3	.608	.655	.544	.111	85.5	90.2	81.4	8.8
4	.629	.671	.580	.091	82.8	86.6	80.8	5.8
5	.595	.645	.531	.114	84.0	89.8	79.8	10.0
6	.530	.569	.463	.106	84.8	91.0	81.5	9.5
7	.508	.545	.453	.092	85.7	90.4	82.7	7.7
8	.524	.558	.486	.072	83.7	84.6	81.7	2.9
9	*Sunday.*							
10	.577	.610	.516	.094	83.0	88.1	76.2	11.9
11	.551	.600	.487	.113	84.8	90.3	81.3	9.0
12	.535	.581	.478	.103	83.8	88.7	81.5	7.2
13	.536	.584	.461	.123	83.0	88.8	80.1	8.7
14	.570	.613	.518	.095	82.6	87.3	79.8	7.5
15	.593	.660	.530	.130	83.3	89.0	80.0	9.0
16	*Sunday.*							
17	.448	.509	.352	.157	84.9	91.0	81.0	10.0
18	.440	.500	.370	.130	82.8	87.2	81.0	6.2
19	.500	.576	.442	.134	82.9	87.3	77.6	9.7
20	.546	.600	.479	.121	84.4	89.5	80.6	8.9
21	.582	.654	.503	.151	84.2	89.2	80.4	8.8
22	.635	.699	.572	.127	84.8	91.6	80.6	11.0
23	*Sunday.*							
24	.595	.649	.523	.126	84.2	85.4	83.0	2.4
25	.495	.577	.407	.170	82.9	87.6	80.5	7.1
26	.494	.554	.450	.104	80.2	83.0	78.6	4.4
27	.551	.611	.504	.107	80.1	82.8	78.8	4.0
28	.593	.647	.545	.102	83.3	89.8	79.2	10.6
29	.600	.674	.513	.161	87.3	93.6	82.1	11.5
30	*Sunday.*							
31	.452	.517	.359	.158	83.7	90.7	80.0	10.7

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1854.

Daily Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Date.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
1	82.6	2.5	81.3	3.8	1.043	11.15	1.42	0.887
2	*Sunday.*							
3	82.0	3.5	80.2	5.3	1.008	10.77	1.95	.847
4	80.8	2.0	79.8	3.0	0.995	10.69	1.06	.910
5	81.0	3.0	79.5	4.5	0.986	10.55	1.62	.867
6	82.1	2.7	80.7	4.1	1.024	10.95	1.51	.879
7	82.6	3.1	81.0	4.7	1.034	11.03	1.77	.862
8	82.0	1.7	81.1	2.6	1.037	11.10	0.97	.920
9	*Sunday.*							
10	80.7	2.3	79.5	3.5	0.986	10.57	1.25	.894
11	82.1	2.7	80.7	4.1	1.024	10.95	1.51	.879
12	81.2	2.6	79.9	3.9	0.998	10.69	1.41	.883
13	80.6	2.4	79.4	3.6	0.983	10.54	1.28	.892
14	80.7	1.9	79.7	2.9	0.992	10.66	1.02	.913
15	81.2	2.1	80.1	3.2	1.005	10.77	1.16	.903
16	*Sunday.*							
17	81.4	3.5	79.6	5.3	0.989	10.58	1.91	.847
18	80.4	2.4	79.2	3.6	0.976	10.48	1.27	.892
19	80.3	2.6	79.0	3.9	0.970	10.42	1.37	.884
20	81.1	3.3	79.4	5.0	0.983	10.51	1.80	.854
21	81.4	2.8	80.0	4.2	1.001	10.72	1.52	.876
22	81.7	3.1	80.1	4.7	1.005	10.73	1.73	.861
23	*Sunday.*							
24	81.8	2.4	80.6	3.6	1.021	10.92	1.32	.892
25	80.7	2.2	79.6	3.3	0.989	10.63	1.16	.902
26	78.8	1.4	78.1	2.1	0.943	10.18	0.70	.936
27	78.8	1.3	78.1	2.0	0.943	10.18	0.66	.939
28	81.5	1.8	80.6	2.7	1.021	10.94	0.99	.917
29	84.2	3.1	82.6	4.7	1.087	11.56	1.85	.862
30	*Sunday.*							
31	81.1	2.6	79.8	3.9	0.995	10.66	1.41	.883

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Height of the Barometer at 32o Fahr.	Range of the Barometer for each hour during the month.			Mean Dry Bulb Thermometer.	Range of the Temperature for each hour during the month.		
		Max.	Min.	Diff.		Max.	Min.	Diff.
	Inches.	Inches.	Inches.	Inches.	o	o	o	o
Mid-night.	29.572	29.645	29.434	0.211	81.9	84.2	76.2	8.0
1	.559	.635	.410	.225	81.7	84.4	77.0	7.4
2	.547	.625	.403	.222	81.5	84.2	77.2	7.0
3	.540	.622	.406	.216	81.3	84.2	77.6	6.6
4	.537	.617	.420	.197	81.1	83.9	77.6	6.3
5	.540	.621	.425	.196	80.8	83.6	77.6	6.0
6	.553	.639	.451	.188	80.9	83.6	78.2	5.4
7	.570	.665	.466	.199	81.7	83.9	79.2	4.7
8	.588	.693	.476	.217	83.0	85.6	79 6	6.0
9	.593	.699	.483	.216	84.6	87.6	80 2	7.4
10	.592	.696	.476	.220	85.8	88.8	82.4	6.4
11	.586	.680	.476	.204	86.7	90.4	79.8	10.6
Noon.	.571	.662	.461	.201	87.3	91.4	79.2	12.2
1	.550	.643	.431	.212	87.2	92.0	81.2	10.8
2	.528	.622	.410	.212	86.7	92.6	79.8	12.8
3	.512	.598	.372	.226	86.6	93.6	79.4	14.2
4	.495	.580	.364	.216	86.2	92.4	78.6	13.8
5	.488	.582	.352	.230	85.3	92.8	79.8	13.0
6	.501	.587	.367	.220	84.4	92.0	80.1	11.9
7	.520	.605	.397	.208	83.9	89.7	79.7	10.0
8	.543	.621	.413	.208	83.5	88.8	79.2	9.6
9	.562	.647	.447	.200	83.1	88.3	78.8	9 5
10	.578	.662	.443	.219	82.8	87.7	79.0	8.7
11	.579	.669	.443	.226	82.5	86.9	79.3	7.6

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1854.

Hourly Means, &c. of the observations and of the hygrometrical elements dependent thereon. *(Continued.)*

Hour.	Mean Wet Bulb Thermometer.	Dry Bulb above Wet.	Computed Dew Point.	Dry Bulb above Dew Point.	Mean Elastic force of Vapour.	Mean Weight of Vapour in a cubic foot of air.	Additional weight of Vapour required for complete saturation.	Mean degree of Humidity, complete saturation being unity.
	o	o	o	o	Inches.	T. gr.	T. gr.	
Midnight.	80.3	1.6	79.5	2.4	0.986	10.62	0.82	0.928
1	80.3	1.4	79 6	2.1	.989	.65	.72	.937
2	80.2	1.3	79.5	2.0	.986	.62	.69	.939
3	80.1	1.2	79.5	1.8	.986	.62	.62	.945
4	79.9	1.2	79.3	1.8	.979	.55	.62	.944
5	79.7	1.1	79.1	1.7	973	.49	.58	.948
6	79.8	1.1	79.2	1.7	.976	.52	.58	.948
7	80.3	1.4	79.6	2.1	.989	.65	.72	.937
8	81.1	1.9	80.1	2.9	1.005	.77	1.05	.911
9	81.8	2.8	80.4	4.2	.014	.85	.54	.876
10	82.3	3.5	80.5	5.3	.017	.87	.96	.847
11	82.6	4.1	80.5	6.2	.017	.85	2.33	.823
Noon.	82.9	4.4	80.7	6.6	.024	.89	.52	.812
1	82.8	4.4	80.6	6.6	.021	.86	.51	.812
2	82.8	3.9	80 8	5.9	.027	.94	.24	.830
3	82.4	4.2	80.3	6.3	.011	.78	.36	.820
4	82.4	3.8	80.5	5.7	.017	.85	.14	.835
5	81 9	3.4	80.2	5.1	.008	.77	1.87	.852
6	81.7	2.7	80.3	4.1	.011	.82	.49	.879
7	81.4	2.5	80.1	3.8	.005	.75	.38	.886
8	81.0	2.5	79.7	3.8	0.992	.63	.37	.886
9	80.9	2.2	79.8	3.3	.995	.69	.17	.901
10	80.9	1.9	79.9	2.9	.998	.72	.03	.912
11	80.7	1.8	79.8	2.7	.995	.69	0.95	.918

Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of July, 1854.

Solar radiation, Weather, &c.

Date.	Max Solar radiation.	Rain.	Prevailing direction of the Wind.	General aspect of the Sky.
	o	Inc.		
1	..	..	S. sharp in the morn.	Cloudy with flashes of lightning in the morning.
2	*Sunday.*	0.92		
3	142.0	..	S. or S. E. or E.	Cloudless between 2 and 6 A. M and cloudy the rest of the day, also drizzling at 5 P. M.
4	..	0.10	S. E. or E.	Cloudless till 4 A. M. cloudy afterwards with occasional raining.
5	135.0	..	E. (high)or S.E or S.	Cloudy.
6	136.0	..	S. occasionally sharp.	Ditto and raining at 5 P. M.
7	124.5	0.15	S.	Ditto and raining occasionally.
8	..	0 40	S.	Ditto
9	*Sunday.*	0.80		
10	114.0	..	S. or S. W.	Cloudy.
11	122 4	..	S. or S. E.	Ditto.
12	124.5	..	S. E. or E.	Cloudy with occasional drizzling.
13	129.0	..	E. or N. E. or S.	Cloudy and raining at 3 P. M.
14	117.0	0.94	E. or N. or S.	Cloudy and raining between Noon and 3 P. M.
15	138.0	0.57	S. or N. E.	Ditto and raining between 4 and 5 P. M.
16	*Sunday.*	..		
17	147.4	..	S. E. or E. or N. E.	Cloudy.
18	..	..	N. E. or E.	Ditto and raining between 11 A. M. and 2 P. M.
19	119 0	1.50	S. E. or E.	Ditto and constantly raining.
20	141.0	..	E. or S. E.	Ditto.
21	138.0	0.19	E. or N. E.	Cloudless till 4 A. M. cloudy afterwards, also raining at 8 P. M.
22	140.6	0.17	S. E. or N. E. or E.	Cloudless till 2 A. M. cloudy afterwards, also raining at 6 P. M.
23	*Sunday.*	0.76		
24	128.0	..	E.	Cloudy and dirzzling at Noon.
25	131.0	..	Calm or E. high after sunset	Cloudy with occasional drizzling.
26	..	1.78	E. high till 1 P. M.	Cloudy constantly drizzling or raining
27	..	0.46	N. E. or E. or S. E.	Cloudy till 7 P. M. cloudless afterwards, also drizzling between 3 A. M. and 4 P. M.
28	..	0.26	E. N. E or N. W.	Cloudless till 1 A M. cloudy afterwards, also drizzling between 7 and 8 A. M. and 9 P. M.
29	146.0	..	Calm or W. or N. W	Cloudy.
30	*Sunday*	1.60	E. or N. or S. E.	Cloudy, constantly raining with thunder and lightning.
31	144.3			

\i Cirri _i cirro-strati, ^i cumuli, ^_i cumulo-strati, _i nimbi, —i strati, \ i cirro-cumuli.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the Month of August, 1854.

Maximum pressure observed at 9.50 A. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Direction of the Wind.	
1	29.083	92.0	91.8	81.9	..	..	S. E.	∿ scattered
2	29.089	89.0	88.9	81.5	..	..	S. W.	Ditto
3	29.113	89.8	90.5	81.5	..	..	S. E.	∩ Ditto
4	29.107	87.8	87.5	82.8	..	..	E.	∿ all over
5	29.125	86.0	86.5	82.9	..	..	S. W.	Ditto
6	29.137	87.0	87.3	83.0	..	..	S. E.	∿ scattered
7	29.099	85.0	85.5	82.4	..	..	N.	∿ all over
8	29.079	84.0	83.9	80.0	..	..	W.	Ditto
9	29.087	84.5	84.5	79.0	..	..	W.	Ditto
10	29.111	85.0	85.4	80.0	..	..	N. W.	Ditto
11	29.109	85.1	84.9	78.6	..	..	N. W.	Ditto
12	29.091	82.0	82.2	78.3	..	..	N. W.	Ditto
13	29.105	81.0	81.2	80.0	..	..	W.	∿ to E.
14	29.131	79.5	79.5	79.0	..	..	N. W.	∿ all over
15	29.181	85.5	85.7	81.8	..	..	N. W.	Ditto
16	29.203	81.0	80.7	79.0	..	..	S. E.	Ditto
17	29.243	84.9	84.9	79.9	..	..	N. W.	Hazy
18	29.267	80.0	79.5	78.4	..	..	S. W.	∿ all over
19	29.233	84.7	85.0	80.1	..	..	W.	∿ scattered
20	29.225	84.0	84.6	80.0	..	..	W.	Ditto
21	29.247	83.5	83.8	80.5	..	..	N. W.	∿ all over
22	29.219	84.8	84.6	79.5	..	..	W.	Ditto
23	29.149	84.0	84.1	79.1	..	..	W.	Ditto
24	29.195	83.7	83.7	78.5	..	..	S. W.	Ditto
25	29.193	85.0	85.2	79.9	..	..	W.	∿ scattered
26	29.283	87.0	87.8	79.4	..	..	N. W.	∩ Ditto
27	29.285	88.0	88.3	79.0	..	..	N.	
28	29.255	89.5	90.1	78.0	..	..	W.	Clear
29	29.267	90.0	90.5	78.5	..	..	N.	Ditto
30	29.233	90.5	91.5	76.6	..	..	N. W.	Ditto
31	29.223	92.1	92.8	72.5	..	..	N. W.	Ditto
Mean.	29.173	85.7	85.8	79.7	..	..	...	...

Note. The dry bulb and Maximum Register do not agree, the former always reads more than the latter, the average difference is 1.6.

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the Month of August, 1854.

Observations at apparent Noon.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Direction of the Wind.	
1	29.051	94.2	94.3	82.0	..	..	S.	∿ scattered
2	29.055	90.7	91.0	82.9	..	..	S. W.	Ditto
3	29.071	92.5	93.5	82.0	..	..	S. E.	Ditto
4	29.089	89.0	89 1	82.5	..	..	E.	Ditto
5	29.101	89.0	89.1	82.5	..	..	E.	Ditto
6	29.109	84.0	84.2	82.0	..	..	N. E.	Ditto
7	29.067	83.2	82.3	80.4	..	..	W	∿ all over
8	29.051	85.5	85.8	81.5	..	..	W.	∿ scattered
9	29.055	86.5	87.0	80.5	..	..	W.	Ditto
10	29.089	87.5	88.0	80.5	..	..	N. W.	∿ all over
11	29.089	85.8	85.5	79.1	..	..	N. W.	Ditto
12	29.069	81.0	81.0	79.3	..	..	N. W.	Ditto
13	29.079	82.2	82.3	79.0	..	..	N. W.	Ditto
14	29.125	81.5	82.0	80.1	..	..	N. W.	Ditto
15	29.167	86.3	86.0	80.5	..	..	N. W.	∿ scattered
16	29.187	82.0	81.8	79.4	..	..	S. E.	∿ all over
17	29.227	85.9	85 4	80.0	..	..	N. W.	Ditto
18	29.241	80.9	81.0	78 6	..	..	W.	Ditto
19	29.225	86.9	87.2	80.7	..	..	W.	∿ scattered
20	29.219	86.2	86.7	80.3	..	..	W.	Ditto
21	29.219	84.5	84.2	81.6	..	..	N. W.	∿ all over
22	29.203	86.7	86.7	81.2	..	..	W.	∿ scattered
23	29.149	86.0	86.2	79 5	..	..	W.	Hazy
24	29.173	85.3	85.5	78.4	..	..	S. W.	∿ all over ∩ scattered in hor.
25	29.179	87.0	87.6	78.6	..	..	W.	∿ Do. towards do.
26	29.283	89.5	90.4	79.5	..	..	N. W.	∩ scattered
27	29.275	89.5	89.9	79.7	..	..	N. W.	
28	29.243	92.5	93.4	79.1	..	..	W.	Clear
29	29.235	93.2	93.5	79.6	..	..	N.	Ditto
30	29.215	95.5	96.5	80.0	..	..	N. W.	Ditto
31	29.205	95.2	96.4	76.5	..	..	N. W.	Ditto
Mean.	29.135	87.2	81.7	80.2	..	..	..	

Meteorological Register kept at the Office of the Secretary to Government, N. W. P. Agra, for the Month of August, 1854.

Minimum pressure observed at 4 P. M.

Date.	Barometer.	Temperature.			Maximum and Minimum.			Aspect of the Sky.	Rain Gauge.	
		Of Mercury.	Of Air.	Wet Bulb.	Maximum.	Minimum.	Mean.		3 Ft, 2 In. from the ground.	Direction of the Wind.
1	29.001	88.0	86.6	80.5	91.5	82.3	86.9	⌇ scattered	0.112	S. W.
2	29.011	90.0	87.4	82.9	90.0	83.5	86.75	⌇ all over	..	S. E.
3	29.005	86.5	84.3	81.6	92.0	82.0	87.0	Ditto	0.982	S. E.
4	29.023	92.0	91.0	82.5	91.0	81.5	86.25	⌇ scattered	0.502	E.
5	29.055	88.5	87.6	84.0	88.5	84.0	86.25	⌇ all over	0.102	S. E.
6	29.031	83.3	83.3	80.5	83.0	82.5	82.75	Ditto	1.602	N.
7	29.033	81.0	79.8	78.8	84.5	81.0	82.75	Ditto	1.102	W.
8	28.973	82.2	81.6	80.0	85.6	80.0	82.8	Ditto	0.704	W.
9	29.007	90.4	89.7	80.3	89.5	80.0	84.75	⌇ scattered	..	W.
10	29.025	89.5	88.9	82.2	89.0	81.0	..	⌇ all over	..	N.W.
11	29.015	85.7	83.8	81.3	85.2	81.7	83.45	Ditto	..	N.W.
12	29.031	83.9	83.9	81.2	83.4	79.5	81.45	Ditto	0.954	N.W.
13	29.047	85.0	84.9	81.0	84.6	79.5	82.05	Ditto	0.222	N.W.
14	29.083	84.0	83.9	81.0	83.7	77.5	80.6	Ditto	..	N.W.
15	29.109	87.9	87.2	82.5	87.0	80.9	83.95	Ditto	..	N.W.
16	29 143	85.7	85.0	80.9	85.0	81.0	83.0	⌇ scattered	0.205	N. E.
17	29.163	89.5	82.2	82.5	88.0	79.5	83.75	Ditto	..	N.W.
18	29.159	84.5	83.9	80.0	84.0	79.0	81.5	Ditto	0.152	W.
19	29.131	89.5	89.0	81.4	89.0	78 8	83.9	⌇ all over	0.772	W.
20	29.111	88.3	89.0	81.0	89.5	80.0	84.75	⌇ scattered	..	N.W.
21	29.163	85.3	83.5	81.2	83.4	80.0	81.7	⌇ all over	..	N.W.
22	29.119	88.9	88.2	83.0	88.6	81.5	85 05	Ditto	..	W.
23	29.105	87.5	87.0	81.0	87.0	81.5	84.25	Ditto	..	W.
24	29.089	86.8	86.0	80.8	85.8	80.5	83.15	Ditto	..	N.W.
25	29.123	91.9	91.4	80.4	91.0	81.0	86.0	⌇ scattered	..	W.
26	29.199	93.5	93 5	80.8	93.5	80.8	87.15	⌒ Ditto	..	N.W.
27	29.203	94.9	95.2	80 5	95.0	81.0	88.0	..	..	N.
28	29.155	96.0	95.5	79.6	95.0	80.8	87.9	⌇ scattered	..	N.
29	29.131	97.0	96.7	80.0	97.6	81.4	89.5	Ditto	..	N.
30	29.141	99.4	98.0	80.4	97.5	81.5	89.5	Clear	..	N.W.
31	29.123	99.9	99.5	79.0	99.0	82.0	90.5	Ditto	..	N.W.
Mn.	29.087	88.9	88.1	81.0	88.9	80.8	84.91	..	7.411	

Meteorological Remarks and Tables commencing 1*st May*, 1854, *at the Residency, Lucknow.*

Site of observations. The Residency Surgeon's house.

The instruments, arranged in a northern verandah about 25 feet in breadth and raised 5 feet from the ground, are as follow:

Aneroid Barometer No. 10165 compared with the Newman's Standard No. 86, in the Surveyor General's Office, in Calcutta.

The instrument is suspended against the wall facing to the north and at the height of the level of the eye from the ground. It is perfectly sheltered and protected from accident or violence as from the direct or reflected rays of the sun. Attached to the Barometer is a small spirit thermometer.

2.—A wet and dry bulb thermometer by Newman; placed near the Barometer.

3.—A simple mercurial thermometer.

4.—A pluviometer of simple construction.

The site is not very favorable for Meteorological Observations, being almost in the centre of the city, and consequently deprived to a certain extent of free circulation of pure air; and being surrounded on all sides by buildings and small trees, the actual force and direction of the wind are often difficult to ascertain; the condition of the atmosphere and the aspect of the sky are affected by the smoke and exhalations from the city.

J. FAYRER, M. D., F. R. G. S.

Date.	6 A. M. Thermometer. Wet Bulb.	6 A. M. Thermometer. Dry Bulb.	6 A. M. Barometer.	6 A. M. Force and direction of Wind.	6 A. M. Aspect of Sky.	3 P. M. Thermometer. Wet Bulb.	3 P. M. Thermometer. Dry Bulb.	3 P. M. Barometer.	3 P. M. Force and direction of Wind.	3 P. M. Aspect of Sky.	Noon. Thermometer. Wet Bulb.	Noon. Thermometer. Dry Bulb.	Noon. Barometer.	Noon. Force and direction of Wind.	Noon. Aspect of Sky.
1	66	80	29.36	Calm.	Clear.	67	88	29.42	Calm.	Clear.	68	96	29.46	Calm.	Clear.
2	72	84	29.45	Ditto.	Hazy	*					75	91	29.55	S. E. lt.	Hazy.
3	*					74	87	29.60	Fr. S. E.	Hazy.	*				
4	70	84	29.55	E N. E.	Thunderculo-st.	72	86	29.55	Fr. E. N. E.	Ciri.	72	86	29.50	E. fresh.	Cumuli.
5	69	78	29.43	East lt.	Curo-st. hazy.	72	84	29.50	S. E. fr.	Curo-st.	73	88	29.52	Ditto.	Ditto.
6	72	81	29.46	N. E. lt.	Curo-strati.	71	83	29.52	S. E. lt.	Ciri.	78	87	29.52	S. E. stdy.	Curo-cum.
7	72	82	29.42	E. light.	Ciri-strati.	75	86	29.50	S. E. stdy.	Curo-cum.	74	90	29.50	Ditto lt.	Cumuli.
8	69	79	29 42	Lt. Calm.	Clear.	73	83	29.53	Calm.	Ciri.	72	87	29.54	N. W. lt.	Ciri.
9	72	83	29.47	N. W.	Cumuli.	..	..	..	..	..	73	91	29.53	Ditto.	Ditto.
10	68	81	29.43	Calm.	Clear.	*					68	89	29.53	S. W. lt.	Ditto.
11	67	84	29.48	Ditto.	Ditto.	69	89	29.37	S. W. lt.	Clear.	69	92	29.55	S. W. fr.	Ditto.
12	67	83	29.45	Ditto.	Ditto.	68	91	29.57	Ditto.	Ciri.	71	94	29.58	Ditto.	Clear.
13	69	85	29.43	Ditto.	Ditto.	71	90	29.52	N. W. lt.	Ditto.	..	..	..	..	..
14	73	89	29.51	Ditto.	Ciri.	..	..	..	..	..	*				
15	*					74	93	29.60	Calm.	Clear.	74	98	29.57	Calm.	Curo.
16	78	88	29.55	..		..	..	..	..	..	74	94	29.60	S. W. lt.	Ciri-cum.
17	71	88	29.50	Calm.	Hazy.	..	..	..	..	..	74	94	29.62	Ditto.	Hazy.
18	72	88	29.57	Ditto.	Ditto.	*					77	95	29.68	Ditto.	Ditto.
19	71	85	29.50	Ditto.	Clear.	74	93	29.62	Lt. S. W.	Clear.	73	98	29.59	West lt.	Ditto.
20	67	87	29.45	Ditto.	Ditto.	70	93	29.57	S. W. lt.	Ditto.	71	96	29.57	S. W. lt.	Clear.
21	65	87	29.46	Ditto.	Ditto.	..	..	..	..	..	73	97	29.53	Calm.	Ditto.
22	69	87	29 40	Ditto.	Ditto.	*					73	99	29 48	Ditto.	Ditto.
23	70	86	29.32	Ditto.	Ditto.	75	93	29.42	S. W. lt.	Clear.	76	100	29.45	Ditto.	Ditto.
24	72	87	29.32	Ditto.	Ditto.	*					74	102	29.40	Ditto.	Ditto.
25	70	88	29.25	Ditto.	Ditto.	72	94	29.33	S. W. lt.	Clear.	72	104	29.37	Ditto.	Ditto.
26	73	89	29.23	South lt.	Ditto.	80	95	29 30	S. E. lt.	Ditto.	78	101	29.32	S. E. lt.	Ditto.
27	79	92	29.20	S. E. lt.	Ditto.	81	95	29 28	Ditto.	Ditto.	80	99	29.30	Ditto.	Ditto.
28	79	93	29.25	Calm.	Hazy in East.	80	95	29.32	S. E. fr.	Hazy in E.	*				
29	79	91	29.25	Ditto.	Ditto.	*					81	100	29.37	S. E. lt.	Ditto.
30	78	91	29.30	S. E. lt.	Ditto.	79	92	29.32	S. E. fr.	Hazy.	*				
31	79	91	29.35	Ditto.	Clear.	81	94	29.40	Ditto.	Clear.	81	96	29.38	N. E. lt.	Ditto.
Total.	2078	2.491	85.276	..		1.478	1.804	58.924	..	..	1.924	2464	76.701	..	..
Averg.	71.655	85.896	29.455	..		739	902	29.462	..	..	74	94.769	29.501	..	..

* No observation.

Meteorological Observations kept at the Residency, Lacknow, for the Month of May, 1854.

At 3 P. M.					At 6 P. M.					At 9 P. M.						
Thermometer.		Barometer.	Force and direction of Wind	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind	Aspect of Sky.	Thermometer.		Barometer.	Force and direction of Wind.	Aspect of Sky.	Rain Guage Inchee.	Remarks.
Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.				Wet Bulb.	Dry Bulb.					
*					68	95	29.42	S. W. lt.	Hazy.	..	..	..	..	..	..	Dust storm at 3 P. M.
73	94	29 45	S. E. lt.	Hazy.	72	93	29.47	S. E. lt.	Clear.	*	..	..	..	..	..	Fresh breeze—S. E.
*					74	92	29 50	Calm.	Ditto.							all day.
72	86	29.50	E. fresh.	Hazy.	71	85	29 52	Lt. S. E.	Hazy.	73	83	29.53	S. E. lt.	Clear.	..	Light rain last night.
74	89	29.48	Ditto.	Ditto.	74	87	29.44	Lt. E.	Clear.	*						[day, light air at
*					73	89	29.48	Ditto.	Ditto.	73	87	29.56	Ditto.	Ciri.	..	sunset.
73	87	29.46	N. W. fr.	{ Dust storm.	71	85	29 44	Lt. N. E.	Cumuli.	77	83	29.50	Ditto.	Ditto.	..	Fr. breeze during the
*					..	..	..	..	..							Dust storm at 2 P. M.
73	92	29.49	N. W. lt.	Ciri.	*					*						Light shower rain
68	91	29.48	N. W. fr.	Curo-st.	..	..	..	..	..	*						in evening.
69	94	29.48	Ditto.	Ditto.	..	..	..	..	..	*						
..	..	..	..	..	72	96	29.48	Calm.	Clear.	*						
*					72	96	29.47	Ditto.	Ditto.	*	..	..	..	..	..	
..	..	..	..	..	73	92	29.47	Ditto.	Ditto.	*						Shower at 2 P. M.
74	99	29.56	Calm.	C.-cum.	74	94	29.55	Fresh.	V. storm.	*	..	..	..	..	..	none registered.
73	96	29 55	Lt. S.W.	Ditto.	72	95	29.47	Lt. S.W.	Ciri.	*						Dust storm at 6 P. M.
74	96	29 57	Ditto.	Hazy.	73	95	29.53	S. W. lt.	Hazy.	*	..	..	..	..	..	very vt. drops of ru.
75	96	29.62	Ditto.	Cumuli.	73	97	29.60	Ditto.	C.-cum.	*	..	..	..	..	..	Dust storm in the nt.
*					72	97	29.50	Calm.	Hazy.	*	..	..	..	..	..	Weather intensely hot.
70	98	29.50	S. W. lt.	Ciri.	70	97	29.47	Ditto.	Ditto.	*	..	..	..	..	..	Ditto. [until sunset.
72	91	29.47	Calm.	Clear.	*					*	..	..	..	..	..	Intensely hot wind
73	101	29.43	N.W. fr.	Ditto.	72	101	29.38	Ditto.	Ditto.	*	..	..	..	..	..	Ditto.
78	101	29.40	Ditto.	Ditto.	*					*	..	..	..	Noon	..	Ditto. [113.
73	103	29.38	Ditto.	Ditto.	73	102	29.34	Ditto.	Clear.	*	..	..	Temp.	behind.	Tattee 85o	Temp. in shade at noon
*					72	103	29 27	Ditto.	Hazy.	*	..	..	Ditto.	..	Do. 87 & 91o	Intensely hot.
73	105	29.28	S. lt.	Clear.	74	103	29.27	N. W. fr.	Clear.	*	..	..	Ditto.	..	At noon 93o	Temp. in hot wind 112.
76	104	29.27	S. W. lt	Ditto.	77	103	29.23	S. W. lt.	Ditto.	*	..	..	Ditto.	..	At 3 P.M. 90o	Cr. wr. S. E. wind at n.
79	103	29.26	Ditto.	Ditto.	78	103	29.25	Ditto.	Ditto.	*	..	..	..	..	..	Wind changed about
81	102	29.28	S. E. lt.	Ditto.	81	97	29.25	S.E.stdy.	Hazy.	*						2 to 3 P. M.
79	102	29.32	Ditto.	Ditto.	79	100	29.28	S. E. lt.	Curo.	*						
81	100	29.32	Ditto.	Ditto.	..	101	29.30	Ditto.	Ditto.	*	..	..	..	..	..	[night. Strong S. E. wind last
1.633	2.130	64.755	..	..	1.760	2.398	73.538	..	..	223	253	8859	..	..	..	

Lucknow, 1st June, 1854.

	Thermometer 6 A. M.			Thermometer 9 A. M.			Thermometer Noon.			Thermometer 3 P. M.			Thermometer 6 P. M.			Thermometer 9 P. M.		
	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.
Wet...	79	65	71.655	81	67	73.9	81	68	74	81	68	74.227	81	68	73.333	77	73	74.333
Dry...	93	78	85.896	95	83	90.2	10.4	86	94.769	10.5	86	96.819	10.3	85	95.92	87	83	84.333
	Barometer 6 A. M.			Barometer 9 A. M.			Barometer Noon.			Barometer 3 P. M.			Barometer 6 P. M.			Barometer 9 P. M.		
	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.	Maximum.	Minimum.	Mid.
	29.57	29.20	29.455	29.62	29.28	29.462	29.68	29.30	29.501	29.62	29.26	29.434	29.60	29.23	29.415	29.56	29.50	29.53
	Of 29 Observations.			Of 20 Observations.			Of 26 Observations.			Of 22 Observations.			Of 25 Observations.			Of 3 Observations.		

Remarks.

The weather this month very hot and dry.

During the early part of it South West wind prevailed; during the latter part variable frequently from the East and South East.

Dust Storms frequent, one of great violence on the 15th. Light showers of rain attended by thunder and lightning have fallen occasionally, but the quantity was not appreciable in the pluviometer.

Towards the latter part of the month the Eastern horizon clouded and frequent lightning in the same quarter.

Temperature of the hot wind in the shade by frequent observations 112-110. At the same time behind the Tuttee the Thermometer stood at 85-87-90.

J. F.

